'A Dream and $400' Bear Political Fruit

By Marguerite Zientara
CW Staff

FALLS CHURCH, Va. — "A hope, a prayer, a dream and $400 cash" is what Richard Viguerie started with in 1965 as the basis of his own direct-mail business. Fourteen years later, the founder of Richard A. Viguerie Co., Inc. is regarded as a giant and a pioneer in the use of computers in politics.

Viguerie, whose firm is dedicated to fund-raising and other direct-mail appeals for conservative political candidates and organizations at state and federal levels, is acting as a volunteer consultant in the fund raising effort for the Republican Presidential campaign of former Texas Gov. John B. Connally.

Election 1980

The Connally campaign effort has rendered Viguerie "too busy to do all the things he'd like to do," including submitting to an interview, according to his secretary.

It has also replaced Viguerie's earlier work on the (also Republican) Presidential campaign of Rep. Philip M. Crane of Illinois, who reportedly decided Viguerie's money-raising methods — although successful — were too expensive.

Viguerie had raised $2 million for Crane by last August, when the switch to Connally was made at Viguerie's suggestion.

While Crane and Connally are both Republicans, Viguerie deals with conserva-
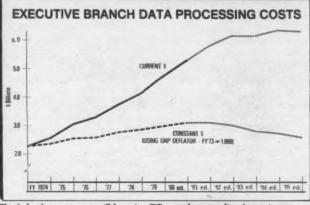*(Continued on Page 8)*

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

EXECUTIVE BRANCH DATA PROCESSING COSTS

The federal government will be using DP more but spending less — in constant dollars — during the next four years, according to OMB predictions.

Carter's 1981 Budget: Continued DP Reliance

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — President Carter's "prudent and responsible" 1981 budget, delivered to Congress last Monday, reflects continued government reliance on data processing and telecommunications resources to trim the cost of running the bureaucracy.

Federal DP expenditures for fiscal year (FY) 1981 are expected to total $5.301 billion, a $445.2 million or approximately 9% increase over FY 1980. The overall budget of $615.8 billion increased about the same percentage over that of the previous year.

By comparison, FY 1980 DP expenditures are estimated at $4.727 billion, up 12.1% over FY 1979, when outlays for federal DP were $4.124 billion. Despite sizable increases in overall DP spending during this period, the federal DP work force did not grow significantly.

These figures, released last week in a special budget report from the Office of Management and Budget (OMB) Information Systems Policy Division, do not include outlays for classified DP activities, telecommunications associated with the transfer rather than processing of data, computers embedded in weapons systems, process control and analog computers or legislative and judicial branch data processing.

OMB also reported a continued but slowing increase in the growth of the federal computer inventory, with most computer equipment continuing to be purchased rather than leased.

For the first time, OMB has provided estimates of DP spending for the next four years. The figures show a decline
(Continued on Page 4)

IBM Method Confuses 4331 Users

By Tom Henkel
CW Staff

IBM's suggested method of bringing up — and keeping up — its 4331 mainframe has confused many users of that system. Some say the procedure takes up too much disk space while others claim it is downright impossible.

The key to IBM's system is a licensed program product called the Interactive Computer Control Facility (ICCF). That program, which resides primarily in main memory, also uses disk space for some files and libraries.

How much disk space ICCF uses is a controversy in itself: IBM says ICCF should not use more than 60% of a single IBM 3310 disk drive, but several users reported ICCF takes up more than 70% of a 3310.

ICCF is used mainly for system generation (Sysgen) and maintenance runs. It can also be used as an on-line programming tool.

To do a Sysgen, users call on an Installation Productivity Facility (IPF), which runs in a pseudo-partition in ICCF along with a Sysgen tape called Installation Productivity Option/Extended (IPO/E). A Sysgen using the IPO/E method takes up about 70% of the total disk space on a minimum configuration of five 3310 drives on a 1M-byte interactive 4331, according to several users interviewed recently.

Much of the disk space used for Sysgen can be recovered after the fact, but users who ordered a batch-ori-

ented 512K-byte 4331 — which has a minimum configuration of four 3310s — may be in trouble. Those users claim they need at least five 3310 drives to do a Sysgen using IPO/E.

IBM refuted that claim, saying IPO/E is capable of generating a 512K-byte 4331 with four 3310 disk drives.

Information contained in IPO/E tapes consists of three base sets of the
(Continued on Page 6)

CN '80 Sees Debut of ASC Controller

By Brad Schultz
CW Staff

WASHINGTON, D.C. — An intelligent communications controller that can automatically split a channel into segments for simultaneous transmission of computer data, facsimile, voice and satellite video was introduced here last week by American Satellite Corp. (ASC).

Highlighting the products introduced at Communication Networks '80 (CN

'80), the controller augments ASC's Satellite Data Exchange (SDX) service, which employs earth stations five meters in diameter at user sites. The stations deliver long-distance transmissions at 56K bit/sec between a user's branch offices or distributed computer centers.

The controller is available with a number of previously announced ASC products, all contained in a single cabinet 45-in. high. A typical application

might call for input programming equipment, a voice digitizer, a multiplexer, a private automatic exchange unit, ASC's Satellite Delay Compensation Unit and the Cryptoline encryption hardware ASC introduced in 1978, a spokesman said.

"The controller can receive inputs from up to 15 slower speed synchronous remote job entry devices," the source noted. "Alternately, the con-
(Continued on Page 6)

IN DEPTH Survivable Systems, CAD/CAM Follows Page 54

An Inside Job, Vendor Believes
Wang Hit for $750,000 in Chips

By Marcia Blumenthal
CW Staff

TEWKSBURY, Mass. — In what may be the largest heist of its kind, an estimated $750,000 worth of semiconductor components were stolen from Wang Laboratories, Inc. here over the Jan. 26-27 weekend.

The theft was believed to be the work of Wang employees who hauled away between 115 and 140 boxes of chips. Each box weighed approximately 30 pounds.

Most of the stolen components were programmable read-only memories (Prom), but some 16K random-access memories and other components were also stolen. "They didn't take the entire inventory of Proms, but it is serious, no question about it," according to Ralph Crusius, vice-president and assistant to the president of Wang.

"For the time being, we don't think it will affect our manufacturing schedule," he added. However, a marketing representative from one of Wang's largest suppliers of these components noted most manufacturers are currently allocating Proms.

Crusius declined to comment on what part of Wang's component inventory the Proms comprised or what the current lead time is for ordering these components. One source said, however, that the industrywide lead time is runnning about eight weeks to six months, depending on the specific product.

Responding to Wang's crisis, one supplier who asked not to be identified said his firm is making an effort to provide Wang with the needed components as soon as possible.

"Proms are tight and we'll have to scramble to get them. It won't be simple, but it is not impossible," Crusius said.

Easy Black Market

The stolen components are standard chips used in a variety of Wang's systems. The culprits, if they are not caught, will probably not have a difficult time finding a market for them because they are appropriate for a number of electronic devices and widely used by toy manufacturers.

Components are attractive to thieves because they are compact and expensive. Because of their value, Crusius said he wouldn't be surprised if the thieves transported the chips well outside of New England for eventual sale.

Local police are being aided in their investigation of the crime by county and state police, according to Sgt. Paul Johnson of the Tewksbury police department. Johnson estimated the theft probably took no more than 20 minutes to complete, occurred between 1 p.m. Jan. 26 and 7 a.m. Jan. 27 and was the work of two to four people.

Because of the layout of Wang's 650,000 square-foot Tewksbury manufacturing plant, the company believes the heist was an inside job. The facility is the largest of Wang's manufacturing sites.

Until now, Wang considered its security tight. Security is maintained by an outside agency, First Security Services Corp., which has about 150 employees assigned to Wang's facilities in the Lowell area.

Wang is reevaluating its security measures and will make changes in the immediate future, Crusius said.

Harris Granted Injunction Against Iranian Government

ORLANDO, Fla. — The U.S. District Court for the Middle District of Florida has granted Harris Corp. a temporary restraining order against the government of Iran, preventing Iran from collecting on a $1.3 million letter of credit related to a contract awarded to Harris more than two years ago.

Granted by U.S. Judge John A. Reed, the restraining order blocks Iranian officials and the government-owned Bank Melli from obtaining any Harris funds until a ruling is made on a lawsuit recently initiated by the firm against Iran.

The lawsuit claims that Iran breached a 1977 contract that called for Harris to manage the installation of an electronic intelligence-gathering and DP system for the country's former government [CW, Jan. 28].

The contract was terminated when the Ayatollah Khomeini's forces took over last February.

Harris is reportedly asking for more than $9.3 million in damages from Iran, which could be seized from Iranian assets frozen in U.S. banks by President Carter last November.

The court scheduled a hearing last week for a preliminary injunction on the lawsuit. However, no details on the session were available at press time.

This Week

Federal Increases for R&D To Reverse 20-Year Trend

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The 1981 federal budget announced by President Carter last week contains a 12% increase for federally backed basic research and a 13% hike for research and development. The increases reflect a fear that the U.S. is losing world leadership in producing new technology, Carter told Congress.

The budget continues a "long-standing commitment to reverse the trends of the last two decades and provide for major and sustained increases — above the rate of inflation — for research and development programs," the President said in his budget message to Congress last Monday.
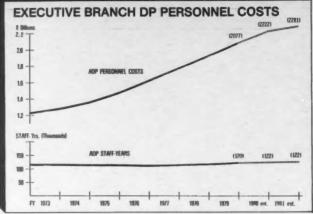
Benefiting from the federal largesse are several ongoing R&D programs such as special efforts by the Department of Defense (DOD) and the National Science Foundation (NSF) to increase the strength of experimental computer science in academic institutions — with $6 million earmarked for this program next year — and a $51 million government program in very large-scale integration (VLSI) technology.

Overall, budgetary obligations for the conduct of basic research will be an estimated $5.1 billion in 1981, representing an increase of $543 million, or 12%, over the 1980 dollar level, or nearly a 3% growth rate above projected inflation. The total 1981 budget of $615.8 billion, by comparison, calls for only a 9% increase in federal spending over 1980.

Proposed federal obligations for the conduct of all R&D, including basic research, are expected to total $36.1 billion in 1981 — a hike of $4.2 billion, or 13%, over 1980. Obligations for R&D facilities are estimated to be $2 billion in 1980 and 1981.

R&D is not a separately budgeted activity of the federal government, but is spread throughout the various agencies and departments of the bureaucracy. Some 14 separate agencies, led by DOD and the National Aeronautics and Space Administration, direct the bulk of federally financed R&D.

The $51 million microelectronics program covers complementary efforts by DOD, NSF and the National Bureau of Standards (NBS). DOD will also expand its R&D efforts in military command, control and communications programs.

Specific NBS obligations include increases for the development and commercialization of VLSI circuits.

EXECUTIVE BRANCH DP PERSONNEL COSTS

No significant increases in the federal DP work force are expected.

Carter's Budget Reflects Growing DP Reliance

in constant dollar expenditures during FY 1982 and through FY 1985, attributable to decreasing hardware costs, the agency said.

Annual expenditures for federal DP constitute roughly 1% of the total government spending slated for FY 1981, which begins Oct. 1 of this year.

The largest absolute growth in general purpose DP between FY 1979 and FY 1980 is expected to be by the perennial leaders in this category: the Department of Defense, up $502.1 million (22%); the Department of Energy (DOE) up $94.4 million (32%); and the Department of Health, Education and Welfare, up $78.3 million (18%).

"Significant relative growth" in DP is expected in the Office of Administration, the Securities and Exchange Commission, the Commodities and Futures Trading Commission and the Selective Service System, which is gearing up for a resumption of military registration.

Obligations for equipment rental by the federal government increased only marginally during FY 1979, $464 million to $484 million, but are projected to increase significantly in FY 1980 and FY 1981 — $630 million and $747 million, respectively.
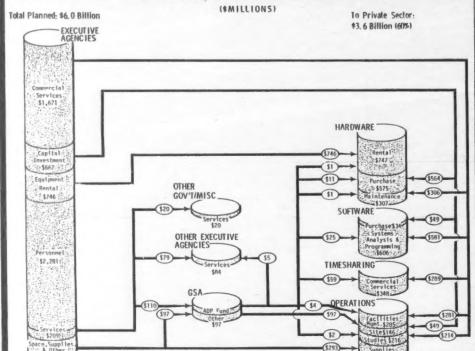
Federal Inventory

Turning to the federal computer inventory, OMB reported the population of federal computers increased from 13,181 CPUs at the end of FY 1978 to 14,984 CPUs at the end of FY 1979 is projected to grow to 18,153 at the end of September 1981, the end of that fiscal year.

More than 70% of the 3,169 computers to be acquired by the government during fiscal-years 1980 and 1981 will be for DOE research and development applications, Department of Transportation air traffic control applications, Department of Commerce weather applications and for administrative and logistic suport for the Marine Corps.

The federal government continues to

purchase rather than lease most of its computers, OMB said. At the end of FY 1979, 91.4% of the 14,984 computers in the federal inventory were owned by the government.

The average age of computers in the inventory was up to 7.3 years at the end of FY 1979, as compared with 7.0 years one year earlier.

While the total computer capacity of the federal government has continued to increase rapidly, the size of its DP work force has not grown signifi-

cantly. Between FY 1979 and FY 1981 the work force is expected to grow from 120,000 staff years to 122,250 staff years, a 1.9% hike.

Federal DP expenditures will continue to benefit the private sector over the next year and a half, OMB noted. More than $2.7 billion, 54%, of the $5 billion spend in FY 1979 went to the private sector, and by FY 1981 the amount is expected to grow to $3.6 billion, almost 60% of the DP outlays.

The federal government also con-

tinues to rely heavily on the private sector for computer-related services. Approximately 26.3% of the resources were spent for labor-intensive activities such as design studies, systems analysis, programming and operations. These expenditures, OMB said, in effect offset the low rate of growth in the federal DP work force.

Executive branch expenditures for commercial DP services are expected to increase 23% in FY 1980 and 9% in FY 1981.

FEDERAL DP: HOW THE MONEY WILL BE SPENT IN FY 1981
($MILLIONS)

Total Planned: $6.0 Billion

To Private Sector: $3.6 Billion (60%)

FY 1981 DP expenditures are expected to climb 9% over FY 1980.

Though Resources Will Be Beefed Up

DP Matching Ruled Out for Draft Registration

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — When President Carter presents Congress with his plan for resumed military registration next week, he will be relying on patriotism and beefed-up Selective Service DP/telecommunications capabilities to produce the millions of names and addresses that will be needed in the event of a return to the draft.

Although the White House and Selective Service System are still hammering out the details of registration, struggling with such thorny issues as whether women should be included, the final scheme will necessitate several million dollars' worth of improved DP resources.

A year-old Congressional Budget Office (CBO) study of the Selective Service estimated that $2 million would be needed to upgrade its DP support to handle registration. This figure assumes that draft boards, which would require major additional expenditures for DP support, are not reactivated.

While few details of the new plan have been released, the Selective Service has said local draft board members will be recruited, but boards will exist only on a standby basis.

Basic Plan

The basic plan, as described by the Selective Service, is to use post office and postal personnel to conduct a face-to-face registration in which Americans between the ages of 18 and 26 will fill out registration forms, supplying such minimal information as name, age and address.

There are some 34,000 post offices in the U.S. The CBO estimated that approximately 2,900 sites scattered across the country would be needed to carry out registration.

The registration forms could be either mailed directly or entered locally or regionally on terminals or minicomputers for transmission to the Selective Service data center here.

Various DP options are being considered, the Selective Service said, including possible use of surplus government equipment or Defense Department computers, which would obviate the need for lengthy and expensive computer acquisitions.

According to a Selective Service official, there are no plans to propose any sort of passive registration using existing computer files such as those maintained by the Internal Revenue Service (IRS) and the Social Security Administration (SSA).

This type of computer matching has

been advocated periodically in Congress and studied by the CBO and General Accounting Office over the last two years [CW, May 7]. This type of program, however, would require a congressional waiver of certain provisions of the Privacy Act of 1974, a move that has been steadfastly opposed by a number of congressmen.

Besides the opposition to passive registration in Congress, the Selective Service official said preliminary feasibility studies conducted last year showed many draft-age males are not included in IRS and SSA computer files, making that option unsatisfactory.

One question plaguing Pentagon officials, however, is: What happens if registration is held and no one shows up? Although the Military Selective Service Act calls for penalties of up to five years in jail and/or a fine of up to $10,000 for failure to register, Defense officials have expressed concern about the effectiveness of a resumed registration.

According to Cmdr. Richard W. Hunter, director of Defense's Manpower Program Analysis, it would be very difficult to enforce the law if large numbers of people fail to register. In that case, some sort of computer matching program might be necessary, he said, although the department is opposed to it philosophically because of

its "Big Brother" tone.

Passive, computerized registration would have difficulty receiving congressional approval except in the most dire national security circumstance, according to congressional sources. And it is not thought likely that President Carter will risk a congressional rebuff to his registration plan.

The President can, by his own authority, reinstate a mail-in or face-to-face registration, although Congress will have to appropriate the necessary funds. Any controversial registration scheme requiring congressional approval, such as one that includes women or passive registration, would face stiff opposition on Capitol Hill.

Correction

In the announcement of the Honeywell, Inc. Level 64/DPS-330 [CW, Jan. 28], the monthly lease costs for the Preforms package were incorrect. Preforms in its batch version costs $19/mo, while the interactive version costs $39/mo. The originally published lease prices of $7/mo and $14/mo are the costs of extended software support that Honeywell offers for the Preforms package, according to a spokesman.

IBM Installation Procedure Confuses Users

DOS/VSE System Control Program (SCP). Those base sets are: data base/-data communications, data communications and batch/interactive.

In addition, base licensed programs, such as DOS/VSE and VSE/Vsam, are included. Optional licensed programs, such as DMS/CICS/VS-DOS, are also included. Therefore, IPO/E tapes vary depending on what program products are installed at the site, according to IBM.

With IPO/E, users can do a Sysgen in about eight hours, as opposed to several days, and they don't need a tremendous amount of expertise to use the package. Using IPO/E for Sysgen, a user answers questions prompted by the IPO/E tape.

In addition, regular maintenance tapes automatically make updates to the DOS/VSE operating system. Prior to IPO/E, users would have had to make those updates in a piecemeal fashion.

ICCF Dilemma

Once the system has been generated, users are faced with the problem of what to do with ICCF. IBM recommends ICCF be left on-line in 1M-byte configurations and dumped off-line in the 512K-byte environment.

If users leave ICCF on-line, however, they can say good-bye to most storage on a 3310 drive; in a five-3310 configuration, losing that much storage could hurt. But off-loading ICCF could prove more painful when it comes time to do a maintenance run.

IPO/E is not a one-shot deal. IBM will send a regular IPO/E maintenance tape, usually once a month. IBM also strongly recommends that the user make use of that tape.

One user said IBM will flatly refuse maintenance on a 4331 installation that is more than two months in arrears in IPO/E maintenance.

The 3310 is a fixed-pack drive, and users who off-loaded ICCF and put data in its place now must off-load that data to tape and put ICCF back on the drive to do the maintenance run. Users say that is a time-cosuming operation.

The difficulty in dealing with ICCF is not as serious for 4331 users who use IBM's 3340 or 3370 disk drives since those drives have removable disk packs.

Strong Recommendation

IBM does not force users to use either ICCF or IPO/E. It strongly recommends it, and at least one user said it is with good cause.

A Denver publishing company tried to Sysgen its 4331 without IPO/E and failed. The problem was "somewhere along the line in IBM's data banks about our account," the firm's DP manager said.

"Our profile was incorrect and consequently some of the materials we were working with were not compatible. We could only get so far and everything started going to hell."

The firm reluctantly went along with IBM's IPO/E method after first failing without it, he added.

Another user preparing for an IPO/E Sysgen came to IBM's defense saying the IPO/E Sysgen and maintenance method is a new idea and some DPers are complaining just because they do not understand it.

The files and libraries created by ICCF would have to be created anyway if a hypothetical user were to do a Sysgen without IPO/E, he added. In addition, a Sysgen without IPO/E would also take up about as much disk space as the IBM process. Some more clever users, however, could possibly do a Sysgen more efficiently than IBM, the user said.

ASC Introduces Controller

troller could process one 56K bit/sec data input for transmission."

This speed range provides more efficient transfers than are possible with conventional ground-based channels, ASC claimed.

But the controller's most distinctive feature seems to be its ability to combine data, facsimile, voice and video in eight different ways. The user can set input priorities for such disparate media, the spokesman stated.

The user might assign narrow portions of the available bandwidth to lower priority transmission types, he explained. However, "the effect of this squeeze on the voice transmission may have an effect on clarity while the channel still remains functional," he said. "When other, higher priority traffic has been passed, the voice transmission will return to its previous quality."

To maximize efficiency over a 24-hour period, the user might program the controller to process facsimile, voice and certain data transmissions during the day and to field electronic mail traffic after hours, the spokesman pointed out.

ASC said the controller costs $250 to install and about $500/mo to use, depending on the features ordered. Therefore, a user's need for data security, multiplexing, propagation delay compensation or protocol flexibility may vary the cost of operation.

ASC is located at 20301 Century Blvd., Germantown, Md. 20767.

Tester for X.25
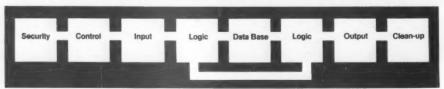
CN '80 was also the occasion for the release of a multipurpose X.25 protocol simulator/tester from Applied Data Communications. Because a number of major vendors have indicated they will support the X.25 protocol adopted by the Consultative Committee on International Telephone and Telegraph in 1976, users may soon need a device like this to facilitate network development and maintenance, the vendor said.

The simulator/tester interfaces directly with terminals and front-end processors for testing. It can also be operated remotely over full-duplex synchronous lines using modems, a spokeswoman noted, or remotely via asynchronous lines.

According to Applied Data Communications, the simulator/tester will mainly be used to simulate an X.25 network for terminal interface development.

After installation, the device can reportedly be used as a line monitor or X.25 validator for those tasks. It costs $11,900 from the vendor at 14272 Chambers Road, Tustin, Calif. 92680.

Commerce Committee Gets It Next
House Subcommittee Says Yes to Rewrite Bill

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives Communications Subcommittee last week passed the H.R. 6121, Telecommunications Act of 1980. If it is enacted, the bill will replace the common carrier section of the Communications Act of 1934.

Passage of the bill by the subcommittee came after some three years of often-acrimonious debate. The bill must now be approved by the House Commerce Committee, then by the full House; afterward, it must be integrated with similar legislation being developed in the Senate.

Reportedly, the Commerce Committee will consider the measure next month. Additional amendments are likely to be proposed.

Although a number of changes were made in H.R. 6121 just before the subcommittee approved it, the revised version is still unsatisfactory to some affected groups. Herb Jasper, a spokesman for the nation's specialized carriers, called the bill "a massive setback for the evolution of competition.

"Instead of fostering a competitive environment, as it purports to do, H.R. 6121 will give AT&T new opportunities to behave unlawfully and to have that behavior declared lawful," Jasper said.

Jasper contended that the bill fails to bar AT&T from using predatory pricing to drive competitors out of unregulated markets. The company could underprice its PBX terminals, for example, or a future on-line DP service offering, then raise those prices after most of the other suppliers were eliminated, he said.

A computer industry source who asked not to be named, said the bill "on the whole is constructive," but quickly added that "some changes may be necessary."

Specifically, he referred to provisions allowing the Federal Communications Commission (FCC) to reregulate a competitive service offered by AT&T if the commission finds the phone company is not marketing it through a fully separated subsidiary or is not properly allocating the related costs, as required by H.R. 6121.

The basic problem is that the bill requires a lengthy proceeding before the FCC to establish AT&T's noncompliance. "The damage might be done well before this proceeding was completed," the source explained.
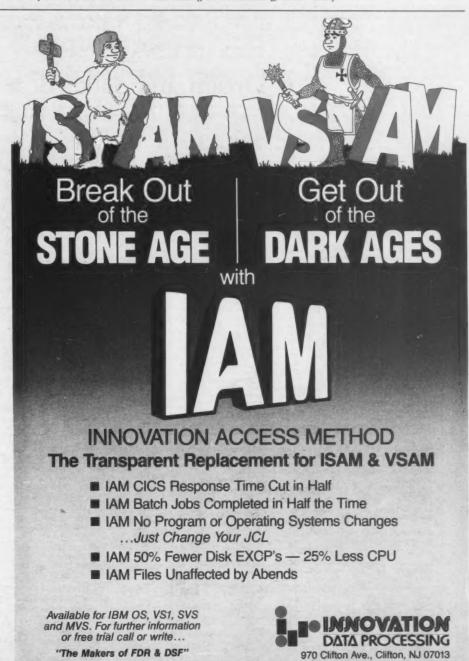
Other provisions of H.R. 6121 require "a dominant carrier and any other regulated carrier" to:

• Interconnect their long-distance telecommunications services and facilities whenever they receive a "reasonable request."

• "Not discriminate with respect to the rates, terms and conditions for such services or facilities."

• "Not establish or maintain any unreasonable or anticompetitive restriction relating to the furnishing, resale or sharing of such services or facilities."

A "dominant carrier" that wishes to establish a fully separate subsidiary must meet a long list of requirements: The subsidiary's board of directors can have no more than one member who is also a director of the parent company; it must maintain separate accounts; it cannot have "a financial structure in common with" the parent; it cannot "engage in marketing any telecommunications services, facilities or products in common" with the parent; and it must conduct business with the parent "in the same manner" as it conducts business with any unaffiliated entity.

Bush DP Effort Turns to East

ARLINGTON, Va. — With Iowa behind it, the George Bush for President Committee has turned its sights on New England, where a caucus and two primaries will be held in the next six weeks.

Besides using computers extensively for its fund-raising activities, the committee also employs them for political persuasion — or attempts to gain ideological backers.

Using an in-house IBM System/6 word processor with three 1,000 word/min ink-jet printers and an IBM 6670 laser printer, plus computer power from outside direct mail consultants, the committee has just sent 150,000 pieces of mail to voters in New Hampshire and 181,000 letters to voters in Massachusetts, where it also plans two more major mailings.

Since Maine is a caucus state (Feb. 10), letters will be sent only to its activists and delegates, according to Jonathan Miller, deputy political director for the committee.

With communicating capabilities over phone lines to Frederick Bush's direct mail fund-raising equipment in Houston [CW, Jan. 28], Miller still maintains separate mailing lists, none of which were rented from brokers.

Miller contracts with National Direct Mail Services, Inc. of Bethesda, Md., as does Frederick Bush, for much of the nitty gritty of direct mail.

The strategy behind all these letters is simply to aim them at receptive people.

Fund-Raiser Offers Recipe for Political Success

By Marguerite Zientara
CW Staff

PHILADELPHIA — A strong candidate with a sharp image who is also "articulate, aggressive and impressive" according to James Aldige, senior vice-president at Richard A. Viguerie Co., Inc. is the most essential ingredient for success in a computerized direct-mail fund-raising campaign.

Speaking at a recent meeting of the Philadelphia Direct Mail Club, Aldige emphasized the computer as the key to Viguerie's direct-mail operation and offered some rules for success in the field.

Besides a strong candidate, a direct-mail operation needs time in order to be effective, Aldige said. For example, candidates must be willing to make their decisions and commitments early enough in the race to allow adequate time for an effective direct-mail campaign.

Eighteen to 24 months should be allowed for building a donor list and sufficient time must also be allocated to testing lists, testing appeals and testing formats, he noted.

Once lists, appeals and formats have been developed, the rule of thumb is to be specific in an appeal, Aldige said. For example, a specific appeal would state that a candidate needs X dollars immediately to go on television for a certain cause or to answer a specific opponent before it is too late.

Another basic rule is to involve the reader of an appeal letter in the first 10 seconds. Since it takes $12 to $20 to acquire one donor — with fund-raising costs approaching 30 cents to 35 cents per letter — the initial impact is a "make-or-break" opportunity, he explained.

Professional Staffing

Success also requires professional staffing throughout the operation, Aldige said. Names must go into the computer without lost time, and accuracy — in such things as spelling names and in citing amounts given in the past — is essential, he added.

Processing of the data and record-keeping must be professional so that data will be there for follow-up purposes, he said. Direct mail, in fact, can be used for a lot more than raising money, Aldige noted.

It can, he said, organize volunteers, mold public opinion, establish platforms, get out the vote, win name recognition and build and maintain lists that are invaluable for future use in many combinations and applications.

Who Is Richard A. Viguerie?

WASHINGTON, D.C. — Called "the Walter Cronkite of Direct Mail" by at least one politico, Richard A. Viguerie started his now-powerful company in 1965 using only service bureaus for computing power.

Viguerie had been the executive director of a "conservative, patriotic" group called Young Americans for Freedom based in New York. He was involved in consulting and direct-mail fund-raising for that organization, according to his senior vice-president, James Aldige.

"He saw the opportunity to form his own agency, the Young Americans became his first client and he went on from there," Aldige said.

As for other political experience, Viguerie worked in the early 1960s on Sen. John Tower's political campaign in Texas, Viguerie's home state. He subsequently became a "young political activist" in the 1964 Goldwater for President campaign, Aldige said.

After running Richard A. Viguerie Co., Inc. for four years using service bureaus, Viguerie acquired his first computer in November 1969, an IBM 360/30.

Last August, Viguerie was nominated by *Time* Magazine as one of the top 50 young leaders in the U.S. Described as "a prime mover of neoconservatism" by *Time*, Viguerie used his direct-mail techniques — this time aimed at political leaders — in a marginally losing battle against the Panama Canal Treaties.

He recently worked against the ratification of the Salt II Treaty.

'A Dream and $400' Bear Political Fruit

(Continued from Page 1)

tives from other parties, as well, including Independents and Conservative Democrats, for instance.

One of the political organizations for which Viguerie has raised millions of dollars a year is the National Conservative Political Action Committee, a nationwide group that supports conservative candidates for public office on state and federal levels, explained James Aldige, senior vice-president of the company.

Backed by a staff of 80, Viguerie's method revolves around several computerized lists of the names of four million to 10 million conservatives who have contributed to various political candidates or organizations in the past. Developed over a period of 15 years of working with "various organizations," the lists contain the name and address of each contributor as well as the amount given and the group to which it was given, Aldige said.

"We have no other demographic information regarding age or anything else that I would consider confidential information," he added. The computerized data is not available to the public, but is kept in "a very confidential manner."

With a total of 35 to 40 clients nationwide, many with their own files of contributors, the firm mails out six to eight different letters for each client during the year, for an annual total of 60 million to 75 million pieces of mail.

Key to Success

"Every letter is different," and that is the key to the company's success, according to Aldige. "Every letter we write for every client must reflect that client's needs and requirements.

"What makes it successful, frankly, is not necessarily being able to refer to the donor's name in the letter as much as the amounts of his contributions, the [exact] months and years of his contributions and references to cumulative amounts of contributions — this is what highly personalizes a letter," he explained.

Letters could contain an appeal to fund a specific project, a request to vote or a plea to send a post card, special letter or telegram to the recipient's congressman. They could also be special advertising-type mailings. Aldige said.

Besides its own gradually compiled mailing list and clients' own lists, Viguerie Co. also makes use of a brokerage company for yet more names and addresses — American Mailing List Corp.

The proof of the method lies ultimately in the amounts of money the company has raised for various candidates. In the 1976 Presidential campaign, Viguerie raised $5 million for former Gov. George C. Wallace of Alabama.

In a 1978 Senate reelection campaign, the firm raised $6 million for Sen. Jesse A. Helms of North Carolina; in the short-lived relationship with Crane, Viguerie raised $2 million.

Using Viguerie's suggestions and magical letter-writing techniques, the Connally direct mail campaign has raised $750,000 to $800,000 to date, with much more to come. "Now that we've determined which test mailings will work, the amounts to be raised will be tremendous," asserted Jon Minarik, head of Connally's direct mail drive

(Connally is currently far ahead of all his presidential rivals, with a total of $8.1 million raised in all.)

Viguerie's prodigious accomplishments in large part are a result of the advent of the computer, Aldige said. "It wasn't really until the computer came into existence that the direct-mail marketing profession was able to accelerate and grow," he noted.

The growth of the direct mail industry, starting in the late 1950s and early 1960s, "is due to a large extent to the progress made in computerization and maintenance of mailing lists, as well as selectivity and processing" of that information.

And while the firm's reputation rests on its political work because "politics attracts a lot of attention," it is not only politics that concerns Viguerie Co. From the beginning the firm has dealt with charitable organizations, nonpolitical issues-oriented groups and behind-the-scenes groups "that don't necessarily get a lot of credit for what they do," Aldige said.

Behind all this activity is an IBM 370/135, about to be upgraded to a Model 145, and an IBM 360-/40. The system also includes an IBM 3211 printer and a 1403 printer.

The company's technical spokesman was unwilling to discuss the details of the installation.

Competition 'Coming of Age'
Communications Regulation Seen Diminishing

By Brad Schultz
CW Staff

WASHINGTON, D.C.— The federal government should and probably will have a diminished role as regulator of the merging computer and communications industries in the 1980s.

Some of the people likely to influence the direction of data communications regulation during this decade expressed that opinion in a panel discussion at the Communication Networks '80 conference here last week. The panel was moderated by former Federal Communications Commission (FCC) Chairman Richard E. Wiley, now an attorney in private practice.

"The 1980s will be known as the era in which competition came of age in the communications industry," FCC Commissioner Tyrone Brown predicated at the conference's annual "Town Meeting."

Two Controversies

Brown mentioned two long-standing issues whose resolution by legislation or court decisions in the near future may streamline federal regulatory procedures and encourage smaller communications carriers and service providers to compete with AT&T, the industry giant.

Those wrangles are: the proposed revision of the 1934 Communications Act — from which the FCC derives its authority to regulate carriers and remote service bureaus — and federal efforts to reconcile AT&T's stature as a major innovator and distributor of communications technology with charges that the firm unlawfully monopolizes the industry, discouraging competition from smaller companies.

For years, the FCC has confronted the latter issue in responding to a long stream of complaints about Bell's activities in the marketplace and in reviewing Bell tariff applications such as the firm's Advanced Communications Service proposal.

Consent Decree

But the courts may eventually settle the matter by acting on another federal agency's initiatives. Last year, the Justice Department's Antitrust Division launched what may be the definitive case against AT&T, which is still bound by the Consent Decree it signed with Justice in 1956 to end an earlier antitrust prosecution.

The 1956 decree is supposed to bar AT&T from significantly entering the computer industry. However, as ex-FCC chairman Wiley and other panelists noted, the court-imposed, decades-old distinction between DP and communications does not jibe with subsequent technological progress, since many contemporary systems serving critical applications feature both processing and communications capabilities.

"The task now before federal regulators is to determine where regulation leaves off and competition begins," Communications Satellite Corp. President Joseph Charyk told the Town Meeting attendees. The government should begin "substituting competition for regulatory fiat," he said.

Other panelists echoed Charyk's suggestion that the year 1980 marks a turning point in public policy on the

information managing sector. Commerce Department Assistant Secretary Henry Geller noted that DP has not been regulated by something like a

CW At CN '80

computing counterpart to the FCC whereas communications has contended with the FCC for nearly half a century. Hence, the marriage of the two technologies forces government to decide whether to greatly extend or diminish its regulatory function.

According to Geller, who directs the Commerce Department's National Telecommunications and Information Administration, "allocation" and "authorization" are the government's two key missions vis-a-vis the "information age."

Government now decides how to allocate portions of the electromagnetic spectrum used in data and voice transmissions, Geller explained. Aside from distributing the frequencies assigned to radio and television, the FCC and other federal agencies must decide how to best serve the public interest in allocating those portions of the spectrum devoted primarily to transmitting data between computer facilities.

Should forthcoming legislation strip the FCC of its purely regulatory duties, the problems of spectrum allocation would still give the commission a full-time job, according to Commissioner Brown.

As to authorization, the second government function cited by Geller, the Commerce official observed that government should ensure privacy protection to people whose records are stored in on-line networks of distributed data bases.

Government should, therefore, oversee the process by which people are authorized to access the computer-stored records of other people, Geller pointed out.

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Communications Act Rewrite

H.R. 6121 Discussion Strikes Discordant Note

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Although H.R. 6121, the legislation rewriting the Communications act of 1934, is being promoted as a "consensus" measure, there is still substantial disagreement about whether it should be enacted.

This became clear here last week at the Communications Networks '80 (CN '80) conference during a panel discussion on the pending legislation. One panelist, Bill McGowan, board chairman of MCI Communications Corp., called the rewrite a "bad bill" and cited several adverse comments received from the computer industry after the latest version of H.R. 6121 was unveiled [CW, Jan 21].

McGowan admitted the bill's critics may be biased, but he pointed out that the Consumers Union, which presumably is more objective, found H.R. 6121 "anticompetitive and anticonsumer."

McGowan and Herb Jasper, another spokesman for the specialized carriers, said the House bill, among other defects, fails to separate AT&T's long-distance and local exchange operations. Further, they said, it does not give the Federal Communications Commission (FCC) adequate power to prevent AT&T from acquiring a dominant position in unregulated markets.

In particular, H.R. 6121 assumes that competition exists in most telecommunications markets and allows Bell to offer unregulated services as soon as the company decides, on its own, that it has established a fully separated subsidiary, Jasper contended. By comparison, he added, S. 611 — one of two rewrite bills now pending in the Senate — requires the FCC to make an affir-

mative determination that competition exists in a particular market before Bell can enter on an unregulated basis.

On the other hand, Rep. Lionel Van

CW At CN '80

Deerlin (D-Calif.), chairman of the House subcommittee that drafted H.R. 6121, noted that the bill gives the FCC broad authority to prevent AT&T from engaging in anticompetitive behavior. Moreover, the bill specifically requires the phone company to estab-

lish fully separated subsidiaries for competitive services, as well as a new accounting system capable of detecting anticompetitive behavior.

Bell has much more to gain from complying with the legislation than from trying to undermine it, Van Deerlin suggested.

The congressman added that H.R. 6121 contains a number of provisions long sought by the computer industry — notably specific language that "removes the threat of [government] regulation."

Reason for Support

Lou Frey, a former congressman who helped draft the original version of

what is now H.R. 6121, provided what may be the strongest reason for supporting the legislation when he said in effect that it is the best bill obtainable given the remaining disagreements. He suggested that opponents of H.R. 6121 might help their cause more by abandoning their opposition.

The communications legislation finally enacted by Congress, Frey pointed out, will be an amalgam of the measures now pending in the House and Senate. One of the pending Senate bills, S. 611, is generally supported by opponents of H.R. 6121.

S.611 was drafted by Sen. Ernest F. Hollings, chairman of the Senate Communications Subcommittee.

'General Agreement'

WASHINGTON, D.C. — While "disagreements exist and will persist, a general agreement has emerged over the basic policy objectives of legislation rewriting the Communications Act of 1934, Sen. Ernest F. Hollings, chairman of the Senate Communications Subcommittee, told a conference luncheon at Communication Networks '80 here last week.

"The various legislative proposals now appear to approach those policy objectives in similar ways . . . we all have found a common language," he said.

Regarding the remaining unresolved issues, Hollings warned that if they are "inadequately dealt with . . . I for one would prefer no bill. Legislation for its own sake does not serve the public's interest."

If competition in the telecommunications marketplace is to be "viable," he added, "we must require dominant carriers to create fully separated subsidiaries for their competitive activities." He agreed with the telephone industry that such subsidiaries must be set up in a way that does not place "a company at a competitive disadvantage."

Stolen Keyboards Recovered

DALLAS — The president and secretary-treasurer of a computer brokerage firm here were indicted by a grand jury earlier this month on charges of receiving and concealing $300,000 to $400,000 worth of stolen IBM keyboards for resale.

Charged with the thefts were Don Norris, president of Metroplex Computer Co., Inc. here, and the firm's secretary-treasurer, Marilyn Morris. Also charged were an independent truck driver and an employee of the Ft. Worth moving company warehouse where the equipment was stored.

Allegedly in operation since October of 1977, the theft operation was uncovered through a tip to Dallas

police that led to a nine-month investigation, according to Dallas Police Investigator C.E. Robertson.

"We received information that the company was buying stolen keyboards and we conducted a pretty extensive investigation," Robertson said. Armed with the name of the warehouse employee said to be delivering the keyboards to Metroplex, the police conducted a search under warrant of his home, where they recovered 60 keyboards.

At the same time, police kept Metroplex under surveillance and observed the delivery of stolen keyboards, which were then found "inside the place of business," according to Robertson.

DP Cross-Checks Uncover Biggest L.A. Welfare Fraud

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — A welfare fraud scheme that some law enforcement officials believe to be the most lucrative in U.S. history was reportedly uncovered here during a recent cross-check of Los Angeles County computer records.

The scheme was allegedly perpetrated by a loose association of 10 local friends and relatives, three of whom were recently apprehended by investigators from the county district attorney's office.

The three arrests capped a two-and-a-half-year investigation into a welfare fraud ring whose members are suspected of having received $340,520 in illegal benefits from the county's Aid to Dependent Children program.

In its four years of operation, the scheme allegedly earned its participants almost $50,000 more than a similar fraud that ended two years ago with the arrest and conviction of so-called "Welfare Queen" Barbara Jean Williams. For five years starting in 1973, Williams bilked the county of almost $300,000 in a scam that until now was considered the largest U.S. welfare fraud case on record.

Williams, whose activities were discovered through computer cross-checking, is currently serving an eight-year prison sentence for fraud and related offenses.

Tips From Informant

In the latest welfare fraud case, investigators got their first big break when they received two key tips from a confidential police informant, according to William Reyes, head of the county's Welfare Fraud Investigation Section.

In trying to verify the tipster's information, investigators cross-checked the county's computer-stored welfare records against its on-line file of local street addresses. The cross-check was performed with the Fraud Investigation Section's four Sycor, Inc. UTS 400 terminals, which connect remotely to a Honeywell, Inc. H3200 and a Univac 1100/40 mainframe, both at the county's DP center in nearby Downey.

As a result of the crosscheck, investigators found that several of the county's monthly benefit checks — all written to different recipients — were going to the same address, which was later traced to one of the 10 welfare fraud suspects, Reyes said.

When further investigation of the suspicious address revealed evidence of possible welfare fraud, investigators performed other computer cross-checks to strengthen their case against the suspects.

Reyes, however, refused to explain how the supplementary cross-checks worked for fear of inadvertently helping future welfare cheaters elude capture. "Criminals learn fast," he observed, "and once they know how we work, they will find a way to beat the system."

Investigators noticed several striking similarities between the latest of the county's welfare fraud schemes and the Williams caper. In both cases, the conspirators allegedly applied for and received county welfare by creating scores of fictitious children whose identities they "documented" with forged birth certificates and other phony records, Reyes explained.

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Ifip Congress to Start in Japan, End in Australia

By Tom Henkel
CW Staff

TOKYO — Japan — the sights, the people, the high prices — and lots and lots of computer talk will be evident when the Eighth World Computer Congress comes here in October.

Sponsored by the International Federation for Information Processing (Ifip), the two-part triennial exhibition will start in Tokyo's International Trade Center Oct. 3 and conclude Oct. 8, while the conference seminar program runs Oct. 6-9. Then the entire congress moves to Melbourne, Australia, where the conference program will be repeated October 14-18.

The exhibitors will have an extra day to set up, with the Australian part of the exhibition opening Oct. 15 for four days.

Technical experts from more than 35 countries — including 14 from the U.S. — will present papers during congress seminars. In addition, about 100 international companies are expected to ex-

hibit products and services, according to Ifip.

In both locations, Ifip promises the congress will feature a series of special events and entertainment. But there will be a serious side to the conference too.

The theme of this congress, "Challenges of a Computer Presence," will be carried out in 10 installments including theoretical foundations of information processing; computer architecture and hardware; software — programs and procedures which facilitate development; data base information systems; computer networks and communications; computing in science and industry; business and government applications; social and economic implications; information processing and education; and computers in everyday life.

Developing Nations

The Australian half of the congress will feature a special seminar called

"1980s: Decade of Cooperation on Computer Technology." That seminar will focus on computing in developing nations and how those nations can best use computer technology, according to Ifip.

The organization is trying to get funding from the United Nations Educational, Scientific and Cultural Organization to allow delegates from some developing countries to attend. An Ifip spokesman said no further information is available on that grant at this time.

The seminar on computing in developing nations is being offered free, but proceedings from the seminar will be published and sold.

Ready for More Inflation?

Although Tokyo and Melbourne will be DP hot spots in October, American DPers might find the Tokyo journey in particular less than a bowl full of kumquats.

If there's any place on earth where

inflation runs more rampant than in the U.S., it's Tokyo. A hotel room can cost up to $200 a night — for a private bath and a Westerner's version of a bed.

If Ifip attendees are willing to give up a little luxury, they can move into a ryokan, a Japanese-style hotel with straw mats instead of beds and a short hike to the nearest communal bath. Guests at ryokans are urged to remove their shoes and walk around in hotel-supplied slippers.

However, Ifip has booked blocks of Western-style hotel rooms at below-average rates, and the group is willing to pass its savings along to groups of DPers.

If attendees are thinking of starting a diet, Tokyo could be the place to do it. A good old American steak dinner will run around $50.

More traditional food, such as raw fish, costs about $10 a plate. That Japanese favorite fast-food joint, Madudorunarudo — well-known for Big Macs and fries — will run a cool $2.

There's plenty to see in Japan and most attendees will find more than enough to fill out the three-day stay.

For attendees planning to drop by Tokyo a week early, there will be a major world congress for the medical data processing profession. Called Medinfo '80, the conference will focus on medical computing Sept. 29 to Oct. 4.

On the Australian end of the conference, attendees will be able to sit in on a seminar on the mining industry. That seminar is scheduled Oct. 13 and will consist of addresses and workshop sessions covering the use of computers in metal and coal mining.

Also covered will be seminars on the use of computer graphics in the mining industry, computer-controlled mineral processing, stress analysis and evaluation of uranium deposits.

Delegates will also be offered post-congress tours of mining developments in Australia, Ifip said.

Informational Brochure

Computer scientists, data processing managers and other information processing professionals who are interested in attending the congress can get detailed information about specific tours and commercial air fare in a free 15-page travel brochure.

Twelve programs are described including several post-congress tours, all of which are designed to help make a visit to the joint congresses a pleasurable experience.

The brochure is available from James Adams Jr., travel chairman, at The Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

Lithuanians Sentenced in Fraud Scheme

VILNIUS, Lithuania — To some, it may seem like a simple case of going from rags to ruples. To Soviet authorities, however, a recently uncovered scheme turned out to be the biggest

computer-assisted crime the state ever saw.

Three Lithuanian woman who work at a state-owned calculator factory here have been sentenced to prison

terms ranging from eight to 15 years for allegedly using a computer to steal 78,584 ruples and 25 kopecks — $121,805.58 in U.S. currency.

The trio perpetrated the crime by altering the firm's computerized payroll sheets to create a number of phony employees, according to *Soviet Lithuania*, the town's daily newspaper. A cashier, who was involved in the plot, collected the phantom workers' salaries on the twice-monthly paydays.

The scheme went on for about four years before being discovered, the newspaper stated.

Labeling the episode a "mind-boggling" outrage, the Soviet publication demanded strict fiscal controls to protect state enterprises. The paper did not say if any of the money — which equalled more than 24 years' salary for the average worker — was ever recovered.

'Waiter, There's a Diode in My Soup.'

To Go National If Successful
Ohio Test of Home Videotext Set

By Phil Hirsch
CW Washington Bureau

COLUMBUS, Ohio — A three-month test of a home videotext that could be the forerunner of a service marketed throughout the U.S. and Canada is scheduled to begin here next October.

The test will be conducted by OCLC, Inc., which now provides on-line cataloging services to more than 2,000 public, academic and special libraries in 1,200 U.S. and Canadian communities.

If the test is successful, according to the project director, Dr. Tom Harnish, "it's fair to assume" OCLC will offer a videotext service through this network. The service will be called Channel 2000."

The test will feature a decoder costing "considerably less than $500 in small production quantities," Harnish said. It will have 4K bytes of read-only memory and 8K bytes of random-access memory, enough to hold up to 10 TV frames of information. This will allow information to be down-loaded from the system's central data base and permit the user's terminal to be used off-line as well as on-line.

TV games are one off-line application to be provided during the test. "We plan to offer a new game every week," Harnish said.

Four other major applications will be provided: banking services, community information, listings from the computerized catalogs of the Denison University and Columbus public libraries and entries from the *Academic American Encyclopedia*

Reportedly, the OCLC test will be the first one in the U.S. to provide banking services and encyclopedia information on-line to the home. Arete Publishing Co. of Princeton, N.J., will provide the encyclopedia data base.

Bank One of Columbus, part of a multibank holding company which pioneered the use of automatic teller machines, will offer the banking services. Its customers who participate in the upcoming test will be able to pay their bills automatically, transfer funds among different accounts and obtain a variety of financial information, such as the current rate on money market certificates.

To pay a bill on-line, the user will first request the system to display on his TV screen a record showing how much he owes each creditor. Then, by indexing specified codes into his videotext terminal keypad, the viewer will authorize the bank to pay specified amounts to each creditor.

To assure privacy and security, the viewer will have to give the system a personal identification number as well as his account number before he can see the record. Also, the return information will be formatted in Hoffman code, a bit compression scheme which provides some protection against wiretapping, Harnish said.

A 10,000 page data base will support the upcoming test. Information will travel between the user's terminal and the data base computer — either a Xerox Sigma 9 or a 384K byte, dual-processor Tandem Computers, Inc. minicomputer system — at 300 bit/sec on standard voice-grade telephone lines. Use of Hoffman coding will compress the reply information approximately 40%, however, allowing replies to be transmitted at an effective rate of about 500 bit/sec.

Any TV OK

The terminal adapter, which was designed by OCLC, will clip onto the viewer's TV set antenna. Any color or black-and-white TV, including a portable, will be suitable, Harnish said. "We've already successfully tested sets with screens having diagonal widths as small as 5 inches, he reported.

Harnish said the adapter supplier will be announced in "about a month." Negotiations are currently underway "with about six companies."

Connected to the adapter will be an unpluggable numeric keyboard. This arrangement will allow more elaborate units — Harnish mentioned an Ascii keyboard as one possibility — to be used.

The viewer will use a hierarchical search strategy, like the one employed in Britain's Prestel system, to access information. But OCLC plans to print a directory showing the page numbers of frequently accessed information to shorten searching time.

Goal: $10 Monthly Fee

If the test is successful, Harnish indicated OCLC will offer a videotext service to its 2,000 member libraries in Canada and the U.S. "Our goal is a service costing the user no more than $10 a month. We expect to sell him the adapter for less than $100."

Libraries, he added, may purchase several adapters and loan them to their patrons the way they now provide books.

Asked what services might be provided by such a system, Harnish said "everything in the Prestel catalog" — that means an assortment of information ranging from current stock market quotations and theater listings to bibliographic data bases, wire association news reports, adult education, on-line shopping and home computing services.

'Of Course It Remembers You. It Never Forgets a Zero.'

Volunteers Testing Health Appraisal System

By Ann Dooley
CW Staff

ATLANTA — The Center for Disease Control here is using an automated health-hazard appraisal system to help federal employees lengthen their life spans.

By making employees aware of potential health hazards, the center hopes to motivate employees to improve their life-styles, according to Charles Althafer, director of professional services and consultation.

Volunteers in this pilot program provide information about their medical histories and living habits, which is entered into a computer. The center is using an IBM 370, but the Fortran-based program can be used on any system, even a microcomputer, Althafer said.

The system is programmed to determine each person's chances of dying within the next 10 years if no positive life-style changes are made. It is also geared to project each person's chances for survival if corrective measures are taken.

More than 1,400 federal employees volunteered for the Atlanta project, all of whom were identified only by number to protect their privacy, Althafer said.

Health Data

Information taken from a questionnaire included history of any serious disorders or chronic diseases; family history of heart disease, suicide and diabetes; smoking, drinking and exercise habits; as well as data on race, sex, weight, height, blood pressure

and cholesterol levels.

Men were asked about frequency of rectal exams and women were asked about Pap smears, menstrual cycles and family history of breast cancer.

Additional questions concerned use of seat belts, criminal records, drug use and whether the individual carries a weapon.

The system matches the information with national mortality statistics and estimates each person's chances of dying from an auto accident, heart attack, lung cancer, homicide or other common causes during the next decade.

The program also indicates how each individual's mortality risks compare with those of the average U.S. citizen of the same sex and age and what can be done to improve a person's life-style, such as stopping smoking, wearing a seat belt or undergoing more frequent health exams.

"Something like this is needed to galvanize people into action," Althafer stated. But he added, people should not regard this kind of program as absolute.

The source data, such as mortality statistics taken from death certificates, is not always accurate, while data

changes so fast in some circumstances that it cannot be quantified, he explained. Althafer also warned of the danger of applying group data to an individual.

Although the system is only an indicator, this kind of project may make people stop and think about how" they are treating their bodies and realize they will pay for it eventually, he noted.

The Atlanta study has been very successful so far, he added. Nearly two-thirds of those offered the test participated, and a large number made definite steps toward changing certain bad habits.

Manual Details Municipal DP Use

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. has released a loose-leaf, updatable reference manual that details how to use computers and manage DP resources effectively in municipal governments.

"Computers In Local Government: Finance and Administration" is the first in a series of reference volumes aimed at small government-oriented installations.

Actually an information service, the material is cross-indexed and organized into six sections: applications and case studies, information systems management, hardware selection and evaluation, software selection and evaluation and an applications software directory.

In addition, the service includes DP-related information on taxation records and billings, payroll, financial forecasting, purchasing water and utility billing and personnel records, a spokesman said.

Approximately 400 pages in length, the manual costs $79. Subscribers will automatically be notified of future supplemental updates, the spokesman said from 6560 N. Park Drive, Pennsauken, N.J. 08109.

Atlanta Slated For Spring Meet Of IBM Users

ATLANTA — Common, an IBM user group, will hold its Spring '80 Conference here April 13-16, with P. Martin Foley, president of IBM's General Systems Division, as keynote speaker.

Among the more than 76 sessions planned will be a System/34 communications update; IBM releases and announcements covering the System/3, System/34, System/38 and 5520; a business report and application development system; and RPG II coding techniques.

Also discussed will be CCP application coding techniques and CRT terminal use with the 1800, as well as IBM small system software solutions.

For Common members, registration fee is $55; for nonmembers, $100; for IBM employees, $70; and for students, $25. More information may be obtained from David Lister, Common's Administrative Director, at Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

No Significant Savings Seen
Cbema Opposes FTC Role in Standards-Making

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Controversial I/O interface standards recently adopted by the federal government would not result in significant savings to the DP user community if adopted nationwide, the Computer and Business Equipment Manufacturers Association (Cbema) said last month.

In a filing with the Federal Trade Commission, (FTC), which has proposed federal regulation of DP standards-making activities, Cbema said "any alleged savings [from the standards] would be more than offset by increased adapter costs, system performance degradation and increased operation and administration costs."

Four I/O standards slated for mandatory implementation by federal agencies in June are being contested by four major computer manufacturers in federal court here [CW, Nov. 10]. The purpose of the Cbema submission, however, is to bolster the association's arguments against federal involvement in what is now a voluntary standard-making process carried out by private-sector participants.

FTC Backers

The 20-page Cbema document rebutted testimony before the FTC by A.G.W. Biddle, president of the Computer & Communications Industry Association, and Norman Ream, DP consultant and former director of the National Bureau of Standards Institute for Computer Science and Technology [CW, July 16].

In hearings last July, Biddle and Ream backed an FTC Proposed Trade Regulation on Standards and Certification that would provide for federal oversight of DP standards. The two argued that large computer manufacturers, backed by Cbema, have dominated the standards-making activity and worked to block implementation of effective standards, to the detriment of the user community.

DP standards are developed by the American National Standards Institute (Ansi) X3 Committee, for which Cbema is secretariat. Ansi has rejected the standards proposals the federal government is slated to adopt June 23.

In his July testimony, Biddle said, "Because the 'systems' suppliers in the industry have a strong economic incentive to maintain their market share, they have consistently followed a policy of inhibiting the development of industrywide standards which would promote greater competition in the industry."

Cbema replied that the suppliers who are Cbema members "have actively led the development of industrywide standards." Cbema pointed to a number of standards developed to date, such as those for optical and magnetic character recognition, punched cards, magnetic tapes, disks and programming languages.

"The body of standards provides the capability for information interchange without which the phenomenal growth in the information processing industry over the past 20 years could never have taken place," Cbema claimed.

As for alleged obstructionism of standards making by manufacturers, Cbema argued that it is not wrong to oppose something with which one disagrees. "The mainframe systems manufacturers exercised their rights to vote (one vote each) on X3 just like other members of X3," Cbema said, noting that approximately half of the negative votes on the I/O standard were from nonsystem manufacturers.

The stated reasons for the negative votes were summarized by Cbema as follows:

• The alleged cost savings will not be realized.

• The technology employed is out of date.

• The freezing of systems architecture is inappropriate.

• The specification of internal system design is an unwarranted intrusion into a proprietary area.

• The potential impact on innovation, competition, foreign trade and jobs is negative and contradictory to the government's responsibility to the nation.

These arguments are mirrored in the suits against federal adoption of the four I/O standards by Honeywell, Inc., Burroughs Corp., Control Data Corp. and Sperry Corp. The court is now weighing government arguments for dismissal of the suit, after which it will consider a motion by the four companies for a summary judgment to block the standards.

In its FTC filing, Cbema also rebutted Biddle's and Ream's claims that it is a conflict of interest for the association to serve as X3 secretariat while representing major DP manufacturers in its day-to-day operations.

Furthermore, the association said, "it is evident in the U.S. computer industry, with no such standard, the freedom and pursuit of innovation has been the very thing which has spearheaded the rapid pace of cost/performance improvement. Maintaining the flexibility of internal computer architecture design has reduced the cost of computers."

Venezuelan Airline Automates Reservations

Special to CW

CARACAS, Venezuela — Avensa Airlines, Venezuela's national airline, last year automated its increasingly burdened manual reservation system after deciding to use a computer-based system to combat rising clerical costs and falling efficiency.

Many of the flights taken by the airline's 100,000 passengers every month were either overbooked or underbooked, while uncounted numbers of reservations were lost in the cracks of the elaborate manual system, according to Benito Alonso, Avensa Airlines'

group director of data processing.

After researching three possible ways to automate, Avensa — which bills itself as Venezuela's fastest growing airline — decided to take a route that least disturbed its hardware and software. This route involved using an on-line systems development productivity tool from a McLean, Va. firm, Planning Research Corp.

Better Service

Eight months after the inauguration of this system, the airline sports a far better level of service, with an average response time of 3.5 seconds to a flight request, Alonso said. If a flight is fully booked, detailed information on alternative routes is available on-line.

Customers can use the system to arrange for hotel accommodations or automobile rentals or to request other services such as special meals. All services are provided in Spanish, German, Italian, French and English.

Avensa administrative computing requirements had already saturated its IBM 370/-115, which has 384K bytes of memory, along with six 3340 disk units and several local terminals. Software already included IBM's CICS, a statistic generator, Applied Data Research, Inc.'s The Librarian, Cincom Systems, Inc.'s Total data base management system and Informatics, Inc.'s Mark

IV file processor/report.

Although Avensa executives admired the IBM Passenger Airline Reservation System, the airline could not support it. Time — the system was needed in 10 months — and money did not allow the airline to recruit the necessary staff to design a CICS system from the ground up, Alonso explained.

The first possible solution considered was to buy a dedicated hardware and software system for airline reservations and flight control, but recruiting the needed computer professionals is as difficult and costly in Venezuela as it is in the U.S. Hardware would have been costly and difficult to obtain and would have presented staffing and maintenance problems.

Moreover, the projected workload for the system did not justify its acquisition for about six years.

The airline next considered a conversion of all programs and systems to operate under another system. However, Avensa was already moving ahead on operations and projects like installing remote IBM 3790 intelligent terminals. Such a drastic change was rejected because the negative impact of wasting previous effort and delaying existing projects would have been too extreme, the director continued.

The third solution, and one that would least disrupt the

present system, was to continue with current software and build the on-line reservation system quickly, using the airline's Cobol programmers, airline executives reasoned.

Planning Research's central software was chosen by the airline because this software promised to automatically perform CICS functions. Programmers could therefore write interactive on-line systems programs without referring to CICS macros or internals.

Nine-Month Effort

Planning Research scheduled the entire development effort over nine months. The system was to operate on the current hardware, using standard IBM-supported software, and was not to interfere with any other applications currently in

operation or contemplated in the future, Alonso said.

Development started in August 1978, performed by three Avensa Cobol programmers and supervised by a Planning Research analyst. By December, the Flight Control Master System had progressed ahead of schedule and testing was begun.

The system was ready for full use by mid-April 1979, one month ahead of schedule. Besides improved response times and lowered clerical costs, the automated reservation and flight planning system has helped Avensa increase the percentage of filled seats on each plane. The new system provides for reserved seats, stand-by seats and blocks of seats that are reserved by specific agents, according to Alonso.

Illegible Ticket Dismissed

BALTIMORE, Md. — A circuit court judge here overturned a driving conviction because he found it difficult to understand the charges as they appeared on a computer printout.

Baltimore County Chief Circuit Court Judge John E. Raine said in his ruling that the unsigned printout was confusing — "a charging document can be very succinct, but it should advise the lay person what the charge is."

Esther Hunter, a New York resident, had been convicted by a district court of driving 71 miles per hour in a 55-mph zone and was fined $35. She appealed to the Baltimore County Circuit Court and was granted a jury trial, according to Deputy Circuit Court Clerk William Allen.

At some time between the district court conviction and the beginning of the circuit court trial, however, the traffic ticket was replaced by a computer printout that substituted code numbers for the original verbal description of the incident. The printout had reportedly been developed to streamline the processing of documents.

The judge dismissed the case and sustained the appeal "for lack of a proper charging document."

Newsletter Eyes Micros

ENGLEWOOD, Colo. — A newsletter for the engineer interested in advances in the microcomputer area is now available from Engineering Computer Applications, Inc.

The "Engineering Computer Applications Newsletter" reportedly covers the experiences of other engineers, computer capabilities and limitations, guidelines, new devel-

opments and literature reviews.

Twelve-month charter subscriptions are available at a reduced rate of $24 ($30 overseas airmail).

Engineering Computer Applications, Inc. is located at 5 Denver Tech Center, P.O. Box 3109-MIZ, Englewood, Colo. 80111.

Managers on the Move

KARLIS V. RUTINS has been promoted to divisional vice-president at American Hoechst Corp. in Somerville, N.J.

Rutins is director of information systems, planning and services. Joining American Hoechst in 1966 as systems manager, he was promoted to director of information services in 1971.

Prior to joining American Hoechst, Rutins was a systems engineer with IBM, an industrial engineer with East-

Bill　　　　　Rutins

man Kodak and a research associate at Allied Chemical Corp.

He received his B.S.M.E. from the New Jersey Institute of Technology in 1963 and his M.S. in industrial engineering and management from Columbia University in 1965.

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DAVID W. BOBOWSKI has been elected assistant vice-president of data processing systems at The Hartford Insurance Group in Hartford, Conn.

Bobowski joined The Hartford in 1958. He transferred to data processing systems in 1962 and was named assistant superintendent in 1967, superintendent in 1968 and assistant director in 1969.

He was elected an assistant secretary in 1970 and a secretary in 1972. In 1973, he was named director of management services in the systems department.

Bobowski was most recently promoted to deputy director of data processing systems with responsibility for the Management Services and Policy Services Divisions.

•••

CHARLES J. BILL has been appointed director of information plan-

Dubbert　　　　　Nissen

ning at Joseph E. Seagram & Sons, Inc. in New York.

Bill joined Seagram in 1972 as a systems consultant in the Distributor Consulting Department. Previously, he spent five years in DP consulting in the Pittsburgh office of Ernst and Ernst, an international auditing firm. Before that, he was a systems analyst with U.S. Steel in Pittsburgh.

Bill holds a B.S. in mathematics from Alliance College in Cambridge Springs, Pa. He received his Pennsylvania state teaching certificate from California State College in California, Pa.

•••

RICHARD F. BEAIRSTO has been named director of data processing at the Krystal Co. in Chattanooga, Tenn.

Beairsto is a former vice-president of information services for Hardee's Food Systems, where he had responsibility for DP, administrative services and field support.

A graduate of New Mexico State University, he holds a B.S. in business administration.

•••

JAMES R. DUBBERT has been appointed director of management information systems at Gates Learjet Corp. in Wichita, Kan.

In his new position, Dubbert will be responsible for the integration of a new production and inventory control system with other DP systems. He will also assist in the development of an improved corporate information system.

In addition, Dubbert will be responsible for the DP functions of the corporation's Aircraft Division with facilities in Wichita and in Tucson.

Dubbert was formerly in charge of

Bobowski　　　　　Beairsto

management advisory services for the Houston office of Seidman & Seidman, a public accounting firm. He holds a B.S. degree in engineering from Michigan State University and completed course work toward an M.B.A. degree.

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CHRISTOPHER H. NISSEN has been named vice-president of information services at WTC Air Freight.

Nissen joined WTC as director of information services, having previously served in several management positions with Pan American World Airlines and, most recently, as Flying Tiger Line's director of industrial engineering and as director of operations for the New York region.

Nissen is a graduate of Dartmouth College and holds an M.S. degree in systems management from Florida Institute of Technology.

•••

ROBERT H. ZEUNER has been named computer operations manager at Danners, Inc. in Indianapolis, Ind.

Zeuner, who joined the firm in 1975, was previously supervisor of operations.

He holds an A.S. degree from Indiana Vocational Technical College.

Costing System Aids Judges in Building Contest

By a CW Staff Writer

MUNCIE, Ind. — An architectural design competition held here at Ball State University has apparently broken new ground by using a computer to analyze the submitted designs construction costs.

A jury of five nationally known architects weighed a variety of factors, including design and utility, before awarding Crumlish/Sporleder and Associates of Great Bend, Ind., the contract to design an addition to Ball State's College of Architecture.

The new design will nearly triple the college's present space, bringing it to a total of 129,000 square feet.

Fifty-nine architects or teams of architects registered for the competition, and 39 were picked to participate.

The winning entry in the design contest for an addition to Ball State University's School of Architecture was submitted by Crumlish/Sporleder and Associates of Great Bend, Ind.

Judges picked five finalists to submit advanced proposals, according to Charles Sappenfield, dean of the architecture school.

After completing early design drawings, including dimensioned preliminary floor plans, elevation drawings and outline specifications, the architects filled out budget-analysis forms supplied by McGraw-Hill, Inc.'s New Jersey-based Cost Information Systems Division.

New Application

Although that firm's Computerized Budget Analysis software has been available for several years, Sappenfield said this was the first time an architecture school used it to aid in judging competitive designs. With this software, the school was able to quickly check to see how well the designs met Ball State's rigid budget criteria.

The finalists' budget forms were processed in batch by McDonnell Douglas Automation in St. Louis on IBM 3033 mainframes.

The winning design exceeded the school's $7,779,787 budget by 2%, after a 19% inflation rate — spanning the period from final design through occupancy was figured. Sources say the bid will have to be cut.

The computer cost analysis was based on current wages and material prices for Ball State's Zip Code area. It included markups for overhead and profit, taxes and insurance, general conditions and sales tax.

After the architects submitted models of the five-floor addition, Ball State sent the data from the models to McGraw-Hill, which submitted it for processing to McDonnell Douglas. The following morning, preliminary design estimates were printed out at Ball State for the five jurists.

The Crumlish/Sporleder design has a transparent sloped-glass roof with solar collectors on the south side. The insulated glass is supported by steel-beam trusses that rise four stories from columns to the roof, creating a gable effect.

The north side uses translucent insulated fiber-glass on the slanted roof, admitting uniform soft light to the design studios and classrooms.

Construction will begin in July, Sappenfield said.

Baker to Lead AS Users Group

CLEVELAND — Choice, the Advanced Systems (AS) users group, has named Ronald R. Baker of Reliance Electric Co. here as president of its board of directors.

Also named as 1980 officers were Frank M. Stubblefield, Rand McNally & Co., Chicago, president-elect; Arthur Johnson, Shawmut Bank of Boston, vice-president; Chuck Gonsior, Physicians Mutual Insurance Co., Omaha, Neb., secretary; Charles Collier, Dallas County Services, treasurer; and Jack Hall, Systems and Computer Technology Corp., Malvern, Pa., director.

AS mainframes, formerly from Itel Corp., are now part of National Advanced Systems (NAS). Formed in 1978, Choice acts as a liaison between its members and NAS.

The group will have its first general membership meeting in San Diego this April.

Scientists Studying Why Geese Not Flying South

BATON ROUGE, La. — A massive two-year study of why Canada geese no longer fly as far south previously did as they will be concluded this year at Louisiana State University (LSU).

The scientists here hope computer analysis of the birds' migration patterns will yield clues to help conservationists redistribute the flocks — more than a million birds — to assure their survival.

Forty years ago, the birds flew to this state in the fall in numbers as high as 15,000. Tens of thousands of others flew from the north to Florida and the southern Gulf states.

Now, nearly all spend their winters further north, mostly in Missouri, Illinois and Tennessee. LSU is trying to find out why.

The project is directed by Vernon L. Wright, LSU professor of experimental statistics, a former member of the Illinois Department of Conservation. The department is funding the project along with the U.S. Fish and Wildlife Service Region III office in Minneapolis.

An IBM 3033 is being used to apply advanced statistical techniques to large quantities of bird-banding data that has been gathered over the years.

Magnetic computer tapes were obtained for processing from the Patuxent Wildlife Research Center in Maryland. The center had gathered records on more than 117,000 Canada geese banded in southern Illinois between 1939 and 1976 and from 18,000 geese whose bands were recovered through 1977 between the Rocky Mountains and the Atlantic Coast and from Canada's Hudson Bay to the Texas Gulf Coast.

Variety of Answers Sought

The project coordinators hope to answer a variety of questions in a one-volume report, especially whether the man-made refuges and open fields of grain have caused many of the geese to winter further north than they historically did.

"There are three distinct populations of Canada geese, and a lot of questions have arisen about how distinct these populations are, how long the birds live, what their average survival rate is and about some of the changes going

on," Wright noted.

"We also want to identify other major changes in migration patterns that have taken place over the last 40 years, since the distribution of geese in North America has changed drastically over that period of time," he explained.

If the flocks could be redistributed to their historical wintering grounds further south, they might be able to avoid a catastrophe — such as a drought or oil spill — that could jeopardize the food and water they need to survive.

While the raw data on the birds' migration patterns has been available to waterfowl biologists for sometime, this project is the first to tap the power of a large processor, advanced statistical

techniques and programming to analyse the data and make waterfowl

management decisions, according to Wright.

This flock of Canada geese has settled down for the winter in north-central Missouri, far north of their historical wintering sites. Scientists at Louisiana State University are using a computer to analyze this change in migration patterns.

Asis Sets Date For Annual Meet

ANAHEIM, Calif. — "Communicating Information" is the theme of this year's annual meeting of the American Society for Information Science (Asis), which will be held Oct. 5-10 at the Disneyland Hotel here.

Papers and panels will be presented on electronic messaging, organizational communications, communications technologies and innovative forms of information dissemination.

More than 100 vendors will offer information products, services and systems at the hotel's convention center.

More information is available from the conference chairperson, School of Library Science, University of Southern California, Los Angeles, Calif. 90007 or from Asis headquarters, 1010 Sixteenth St., Washington, D.C. 20036.

IBM introduces the 5280 Distributed Data System, the intelligent alternative, a family of products that offers intelligent terminal, remote batch terminal and data entry capabilities. The 5280 includes seven hardware components and six software support packages in a low-cost, easy-to-use system that can be tailored to your specific requirements.

One system, multiple options

You can install single station/one printer systems in some locations and multi-station/multi-printer systems in others. All using the same programs. You can choose display sizes up to 1920 characters, two different printers, offering a range of speeds from 40 cps to 560 lines per minute, upper and lower case at rated speeds, condensed printing for printing on smaller forms or with up to 198 characters per line.

Data, stored on 1.2 megabyte diskettes, is available for inquiry and update. The total capacity of 9.6 mega-bytes addresses a wide range of remote file requirements. And with 5280 communications capabilities, the information stored on host files is also available remotely.

And, if you are moving from bisync to SDLC, there's no need to change communications adapters. A simple change of programs is all that's required. At the same time, the 5280's compatibility as a network element with other IBM systems enhances their value as well.

Software options

The 5280 offers two high-level languages: COBOL, a subset of 1974 ANSI, and DE/RPG (Data Entry with RPG subroutines) which provides advanced data entry functions with an RPG III subset for calculations. Program support packages for MRJE, SRJE and utilities for most functions are also available.

In addition, the multi-programming capabilities of the system extend right down to single data stations. For example, in order entry applications, the 5280 can be

The New IBM 5280 Distributed Data System:

The Intelligent Alternative

programmed to validate orders as they are keyed while invoices and packing slips are prepared at the same time.

Rent, lease or purchase

The 5280 is available on a purchase, 2-year lease or rental basis with allowances for both pre-installation and on-site testing as well as separate terms for software licenses at remote locations.

To find out more

All this, plus ease-of-use characteristics like error prevention and detection procedures add up to a flexible, simple-to-operate, low-cost intelligent terminal system that can grow with you.

For more information about the new IBM 5280 Distributed Data System and how it can fit into your distributed processing plans, call your General Systems Division representative or write: IBM, P.O. Box 2068, Atlanta, Georgia 30301.

IBM.

Call for Papers

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 1980 INTERNATIONAL CONFERENCE ON CIRCUITS AND COMPUTERS FOR LARGE-SCALE SYSTEMS, Port Chester, N.Y., Oct. 1-3.

The conference will be devoted to large-scale circuits and computer systems. Both regular and short papers will be accepted.

For regular papers, four copies of a 200-word abstract and/or summary must be submitted by April 4.

For short papers, a 100-word abstract of sufficient detail for careful evaluation must be submitted no later than May 4 to Dr. N.B. Guy Rabbat, IBM, D/818, B/300-45A, Hopewell Junction, N.Y. 12533.

1980 INTERNATIONAL CONFERENCE ON PARALLEL PROCESSING, Boyne Highlands, Mich., Aug. 26-29.

Authors are invited to submit papers describing recent advances on all aspect of parallel/distributed processing.

For regular papers, four copies of a 100-word abstract or full text, if possible, must be submitted or a 1,500-word summary in lieu; for short papers, four copies of a 100-word abstract and a 500-word summary must be submitted by March 15 to David Kuck, Duncan H. Lawrie and Ahmed Sameh, Department of Computer Science, University of Illinois, Urbana, Ill. 61801.

1980 GOVERNMENT MANAGEMENT INFORMATION SCIENCES NATIONAL CONFERENCE, Chicago, July 6-10.

All interested parties should submit, as soon as possible, abstracts on any topic of relevant interest to James P. Mitchell, Chicago Police Department, Room 309, 1121 S. State St., Chicago, Ill. 60605.

For Bankers, Governments
IDC Plans Information Service

WALTHAM, Mass — International Data Corp. (IDC) has announced the Information Industry/Technology Service, designed to inform banking, financing and government organizations of developments in data, word and communications processing.

The service will provide research reports, news bulletins, unlimited telephone inquiry service and free attendance at IDC's briefing session and executive conference.

Of particular interest to financial and government organizations are two reports: "Basic Economics of the Information Industry in the '80s" and "Technologies that will Shape Tomorrow's Information Industry."

Other reports will cover specific markets within the DP industry, such as the general-purpose computer market, the minicomputer, word processing and data communications markets and the distributed data processing market.

The service is available for an annual fee of $15,000 from IDC at 214 Third Ave., Waltham, Mass. 02254.

Fraud Prevention Seminars Set

ORANGE, Calif. — TRW Credit Data has announced the preliminary 1980 schedule for its Fraud Application Control Seminars.

Designed to alert attendees to the magnitude of the credit fraud problem as well as offer practical guidelines for spotting and stopping fraudulent credit applications, the program will also present statistical data on the losses suffered by the credit community.

TRW will focus on follow-up methods to assure that cases are properly identified as criminal fraud and provide tips for effective liaison between creditors and law enforcement.

The one-day seminars are scheduled for Orlando, Fla., Feb. 26; Atlanta, Feb. 28; Los Angeles, March 4; Reno, Nev., April 8; Las Vegas, April 10; Norfolk, Va., April 22; and Baltimore, Md., April 24.

Seminars will also be held in Washington, D.C., April 25; Sacramento, Calif., May 6; San Francisco, May 8; New York, May 28; Miami, May 30; San Diego, Sept. 18; Chicago, Sept. 25; and Boston, Sept. 30.

Additional seminars will be scheduled in response to interest. The registration fee for TRW subscribers and law enforcement representatives is $65. For non subscribing credit grantors, it is $80. The fees include luncheon and all seminar materials.

TRW Credit Data is located at 505 City Parkway West, Orange, Calif. 92668.

Free Seminars Scheduled On DOS-to-OS Conversion

DALLAS — University Computing Co. (UCC) will sponsor a series of complimentary seminars on DOS-to-OS conversion. They will be held March 20 in Dallas, April 3 in Chicago, June 5 in San Francisco, June 24 in Los Angeles, July 10 in Boston and Aug. 19 in Washington, D.C.

Seminar topics will include evaluating operating system features in terms of individual needs, suggested approaches to accomplishing a conversion and identifying and overcoming obstacles to conversion.

Other topics will cover the UCC Two DOS-to-OS transition system and conversion project planning and management.

More information is available from the UCC Two Product Manager, University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75235.

Guide Suggests Ways to Screen Job Applicants

HUNTINGTON, N.Y. — A step-by-step management guide that details how to interview and screen prospective employees for computer-related positions has been released by Personnel Publications.

"Interviewing and Selecting Engineering and Computer Personnel" is a 32-page collection of sample preemployment questions that devotes a section to the DP field.

The manual covers questions that should be asked of keypunch operators, computer operators, operations managers and programmers as well as several other computer-related job seekers.

The booklet also includes examples of how to start an interview, control the interview and keep the interview legal as well as a glossary of commonly used computer terms.

The guide costs $4.95. Quantity discounts available from the publisher, which can be reached at P.O. Box 301, Huntington, N.Y. 11743.

FOR $29,062 A MONTH YOU GET THE MEMOREX LEASE PACKAGE.

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When you lease an IBM 3031 from Memorex® Finance Company, you get the same CPU, console and power supply you'd get from IBM at the same cost. But with a Memorex lease package, your new 4MB 3031 comes fully equipped. With Memorex peripherals — a 3221 tape controller, eight 3228 tape drives, a 3674 disk controller, a 3653 disk drive, three 3650 disk drives, a 1372 communications controller and sixteen 1377 CRT's—you get a 3031 computer system instead of just a computer. It's like getting all your peripheral equipment at no additional cost. In fact, only maintenance on the equipment and applicable taxes will cost you extra.

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All designed to provide you with the data processing equipment you need at a reasonable cost.

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MEMOREX FINANCE COMPANY

EDITORIAL

Helping-Hand Policy

IBM's admission that System/3 users that did not strictly adhere to IBM's RPG-II programming methods may have problems converting to System/38's RPG-III [CW, Jan. 28] suggests IBM cares more about its systems than the people who use them.

By the time many System/3 users get their ordered System/38s, they will have waited almost a full year longer than originally promised. When the six- to nine-month delay in System/38 deliveries was announced, many System/3 users were forced to make unplanned upgrades just to ride out the storm. And many of those users were forced to juggle RPG-II programs to survive the delays.

Now IBM says making special adjustments to RPG-II files was the wrong thing to do. IBM seems to be putting the user between a rock and a hard place.

IBM undoubtedly employs some of the top computer scientists in the world. Those scientists probably know IBM systems far better than most users ever could. But that doesn't give IBM a corner on programming style, nor does it give IBM the right to assume all users should conform to its standards.

IBM seems to be forgetting that users are also customers, and they have a right to make their own decisions when it comes to what style of programming they want. IBM may well have the best methods, but making the System/38 accept only strictly adhered-to RPG-II programs restricts individual programmers' ingenuity.

IBM may have been right when it said users have not documented their programs well enough to make the conversion to RPG-III. Users are quick to complain about the hard conversions, but they fail to realize much of that hardship comes from poorly documented programs that no one really understands well enough to convert. Users have got to learn to document instead of blaming the vendor for not providing enough conversion support.

If IBM could give users a helping hand by creating an easy-to-use system that lets the less-than-expert use it, IBM would deserve some credit. IBM would be better off pursuing that helping-hand policy when it comes to conversions rather than being dictatorial on programming style.

DATA PAST

Five Years Ago
Jan. 29, 1975

BLUE BELL, Pa. — Univac killed the Series 90 OS/7 operating system — but in its place the firm offered a virtual operating system called VS/9. Univac claimed the VS/9, operating in a minimum memory of 262K, had all the batch-oriented features of the old OS/7 as well as the best features of Vmos, the virtual operating system the company inherited from RCA.

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WALTHAM, Mass. — Honeywell, Inc. introduced two more computer models for its Series 60 line. The Level 66 Model 66/10 and Level 68 Model 68/60 provided lower cost entry to the Series 60 Gcos Level 66 multifunctional systems and to Level 68 Multics interactive processing, Honeywell said.

Eight Years Ago
Jan. 26, 1972

WALTHAM, Mass. — Honeywell, Inc. introduced the Series 2000 line of medium-scale computers to complement its Series 200 family. The Series 2000's five processors fit between the Series 200 Model 115/2 and the Series 6000 large-scale systems.

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WASHINGTON, D.C. — Sen. Sam J. Ervin Jr. (D-N.C.), chairman of the Constitutional Rights Subcommittee, told Congress it has "an urgent duty to enact laws to control the rapid development of large interlinking computer data systems in the federal government which may affect the rights of citizens who deal with government." Ervin was announcing the publication of the first volume of testimony taken by the subcommittee during its 1971 hearings on federal data banks.

LETTERS

Independent's Opinion

I read with interest the articles by Tom Henkel on the problems IBM 4331 users have had in attaching IBM 3340 disk drives to the system [CW, Dec. 17]. I would have thought that IBM would have debugged the attachment to a greater extent than the article suggested.

In any case, it was interesting to note that independents' 3340-compatible drives don't seem to have the problems, or the problems are much less.

I feel the difference could be that Memorex Corp. offers the 3643/40 subsystem with the Rotational Position Sensing Feature as a standard feature, whereas IBM offers it at additional cost. This may explain why Memorex drives perform better when attaching to the 4331.

N. T. Viswanathan
Manager, OEM Engineering
Memorex Corp.
Santa Clara, Calif.

Array Processors

In reference to Dr. Sidney Fernbach's article entitled "Great Hardware Advances of the '70s" [CW, Dec. 31, 1979-Jan. 7, 1980], I find that there is a total understatement of the role array processors have played as an emerging computer enhancer for cost-effective, high-speed number crunching. The evolution of the array processor has definitely been a highlight of the '70s and has made dramatic contributions to X-ray tomography, seismic data manipulation, acoustics, speech, simulation, image processing . . . and the list goes on.

Array processors in 16-, 32- and 38-bit floating-point and fixed-point formats have changed the way the signal processing community does business. And, more recently, the advent of the 64-bit array processor from CSP, Inc. and the new mini vector processors from Systems Engineering Laboratories, Inc. will have an important impact on the scientific and engineering communities as we enter the '80s.

These entries have been heralded in the trade press (e.g., *Electronics*, June 7 and Aug. 30) as the wave of the future in low-cost computer arithmetic processing.

It would be a shame then, as Dr. Fernbach elaborates on Crays, Cybers and Stars, not to mention that equivalent high-precision number crunching is now available at a fraction of the cost so that local control through a dedicated facility is now an affordable reality.

Philip Blake
Billerica, Mass.

Invasion of Afghanistan

The Russian incursion into Afghanistan should come as no surprise. It was most likely caused by mounting the wrong tape on the Kremlin's defense computer system (recently imported from America), and I'm sure the error will soon be discovered and corrected.

In fact, I bet that the Russian computers are already printing thousands of "personalized" computer letters to each Afghan household, apologizing for the error and offering six fantastic prizes if the enclosed postcard is returned in six days.

Lou Mills
Santa Rosa, Calif.

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P. Kenneth Morse
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SOCIOLOGY OF COMPUTING/Robert L. Glass

The Importance of the Individual

Suppose there was a way of guaranteeing a fivefold increase in programming productivity. Would you be interested?

Do birds sing and dogs growl? Of course you would.

Then you are in for a surprise. Scattered through the computing literature for more than 10 years now have been little clues about something with just that kind of promise. We know a little bit — too little, in fact — about a vital subject that can indeed result in dramatic software productivity improvement.

The fact of the matter is, there are immense individual differences between programmers. Not just your 10% or 20% differences. Big stuff — like five to one differences. The kind we talked about in the first paragraph.

For instance?

For instance, way back in 1968 Jules Schwartz, a computing pioneer, said: "Within a group of programmers, there may be an order of magnitude difference in capability" (SCHW68). Schwartz was studying the problems of developing large-scale software systems, and he found human factors at the heart of the problems and their solutions.

For instance, in 1973 Barry Boehm shook up the whole software world with his "High Cost of Software" articles (BOEH73). Nearly buried under the avalanche of other provocative data was the statement: "Productivity variations of 5:1 between individuals are common."

For instance, in 1975 D.E.W. Bucher, writing one of the rare papers on software maintenance (BUCH75), said: "The prime factor affecting the reliability of software is the selection, motivation and management of the personnel who design and maintain it."

For instance, in 1978 Glenford Myers, in a definitive experiment on software reliability methodologies (MYER78), found: "There is a tremendous amount of variability in the individual results. For instance, two people . . . found only one error, but five people found seven errors. The variability among student programmers is generally well known, but the high variability among these highly experienced subjects was somewhat surprising . . . The detection of individual types of errors varies widely from individual to individual."

For instance, exploring a different discipline, the impact of higher order languages on avionics software (RUBE78), Raymond Rubey wrote: "A programmer having no prior experience . . . wrote a program that was 100% inefficient, while an experienced programmer wrote a version of the same program that was 20% inefficient. Another study reported a 25% improvement in efficiency with greater programmer experience. Clearly, the programmer's experience is a major factor in achieving high efficiency."

And as the ultimate for instance, Werner L. Frank, discussing "The New Software Economics" (FRAN79), put it on the line: "When all is said and done, the ultimate factor in software productivity is the capability of the individual software practitioner."

Finding the Right People

The message is clear. If you want to have the maximum impact on the quality and quantity of the software you build and maintain, you must concentrate heavily on getting the right people.

And there lies the problem. How do you recognize the right people?

It is not the purpose of this article to answer that question. It is, rather, the purpose of this article to motivate people to seek the answer to that question.

The question then is, "What do we know about recognizing the right people?" The correct answer is, "Not much."

Remember the era of programmer aptitude tests? That one was a bust. My recollection is, there wasn't much correlation between test scores and job performance. Have you heard of any good aptitude tests lately?

READER COMMENTARY

Iranian Tragedy Extends to DP

As an American civilian who worked in the computer industry in Iran until the bitter end — that is, the February 1979 sacking of the U.S. Embassy and subsequent evacuation of U.S. citizens — let me refute David Coles' unjustified denouncement of Iranian DP [CW, Jan. 14] as described in a previous article, "Iranian DP Grinds to a Halt" [CW, Dec. 3].

I was not affiliated with any U.S. agency, but was simply trying to make an honest living like all the rest of Iran's foreign labor force. I and many of my friends lost nearly everything we owned over there.

Coles displayed a lamentable attitude and misguided opinion of the Iranian DP situation. Iran was probably less than five years away from DP self-sufficiency in terms of software understanding and hardware maintenance. This was no small feat, since all the documentation was in English and the vendor support was dismal. Some small electronic products, such as modem eliminators, were already being designed and assembled in the country. The goal was eventual fabrication of large-scale hardware in Iran, without dependence on others.

The founding meeting of the Computer Society of Iran similar in purpose to the Association for Computing Machinery was held just over a year ago. Hundreds of educated, motivated and well-intentioned DPers attended and enthusiastically participated, myself included. They looked toward advancement of the state of the art and toward the contributions Iran could make in the field.

Automated billing systems for public utilities were already in place. Many banks had computerized statements, and some engineering firms had minicomputers for complex calculations. The fledging *Mideast Computer* tabloid published its second issue and looked toward a bright future. Military applications of computers were advancing rapidly, spurred by an awareness of the foreign policies of Iran's northern neighbor.

Everywhere the educational and social benefits of automation were beginning to take hold. The transfer of technology was very close to completion, and the tragedy of the Iranian DP situation is that this great work has now gone down the drain. Data bases are gone. Hardware is in disrepair. It will take untold man-years to undo the damage, if indeed there is anything left to salvage.

I disapprove in principle of using *Computerworld's* pages for political invective, as Coles has done. But he must be answered. The iconoclastic reality of compromise and trade-off occurs in foreign policy as in DP. Let us tally the slate.

On the one hand we had a relatively friendly despot, highly civilized for that part of the world, who furthered our political interests in the region and attempted to bring his country into the modern world. This man tried to take Iran from virtual barbarism into the 20th century in one grand leap, and he almost succeeded. His methods were severe at times.

Eyewitness of Executions

Now the alternative. In Iran today we have chaos, anarchy, religious genocide and bloody revolution with thousands killed. I was a prisoner at the Central Komite Headquarters in Teheran during some of the executions. Rest assured they were quite genuine and quite savage. Later executions included old men, pregnant women and alleged homosexuals, not to mention mob violence to minorities in the provinces.

As a side effect, the fall of Iran led certainly to the Russian invasion of Afghanistan, which never would have occurred with the Shah in power. How many thousands were killed there? And of course there are the hostages. . . .

Let me make my final point directly to you, Mr. Coles. Your reprehensible remarks concerning a displaced Iranian DPer are beyond my comprehension. We should welcome such individuals with open arms. I will do everything in my power to help such people, who are our friends.

If you want to see real tyranny, look at Iran now. Look at Russia. Those are your enemies, Mr. Coles, not some poor Iranian refugee who wants to start a new life in a country where he was educated and will be appreciated, despairing of any future in his own homeland.

Forgive my anonymity, but I have personal knowledge of terrorist attacks here in the U.S. on people who speak out against the new regime. Wake up, Mr. Coles. Wake up, America!

The author's name is being withheld by request.

HUMAN CONNECTION　　　　　　　　Jack Stone

Top Management Teams Need DP Players

Because the DP department typically sits way down the organization's totem pole, it is often an unwitting victim of dubious judgments and flaky decisions made by upper level managers. To help solve the decision-making problems and improve the quality of DP life in general, I believe that, for a large number of firms, it's time to consider moving DP managers and their plucky bands of loyal followers out from under the thumbs of middle managers and having them report directly to senior executives.

One key issue relates to planning. Every organization needs and deserves a long-range information systems master strategy — and implementation plan — along with commitments from top management for resources to fulfill the plan, just as most marketing, R&D, engineering and manufacturing activities in larger businesses have today.

Aside from the fact that a long-range plan is a generally accepted management tool, it is especially appropriate for the DPers because it helps them graduate into the major league of industrial enterprise — the executive suite, where, I believe, their presence is sorely needed.

The essence of the information systems plan is a master listing of development and production tasks and schedules, along with resource allocations — people, machines, facilities.

This is the fourth article in a series, "DP Management in the '80s."

Upon approval of the plan and assignment of the resources, the DP department should be left alone to execute the plan.

Where adjustments in initial estimates of resources are found to be necessary, the department can reallocate its resources as it wishes, to meet its systems goals. Of course, to do the plan justice, it should be conceptualized, engineered and developed with the heavy involvement of DPers.

I think that most of us realize that, however perfect the execution of a

THE TAYLOR REPORT/Alan Taylor

DP Vocational School Succeeds With New Focus

Vocational training in the 1980s seems to have some added gimmicks — in the form of automated training aids — but very few, if any, new directions since 1970. At the commercial level, the same central core of assembly, RPG and Cobol — with computer operations and systems analysis thrown in as sidelines — are still being taught. So, when I heard of a school with a different outlook and training method, I frankly wasn't expecting much different. However, when I visited The Center for Computer Education (CCE) and started going over its records, the changes started adding up to a different approach to DP education.

The most drastic change in the curriculum is that CCE concentrates upon a single computer language, Cobol. The students start writing Cobol programs on the first day and are totally immersed in Cobol from then on.

This means, of course, that at the end of the program they probably don't know any assembly or PL/I, which can be regarded as a disadvantage. However, they know their Cobol that much better than people who spend the equivalent amount of time on two or three languages.

The student sees one of the good points of this concentration upon a single language about half way through the course. By this time, his command of Cobol is certainly a lot better than that of the equivalent student half way through the courses in the multilanguage schools. In fact, the student is capable of coming out of the artificial classroom environment, so CCE puts its students into the "real world" for 12 weeks during the courses.

Industry Demand

Indeed, the DP industry as a whole does not use people who know several languages. It uses programmers who know Cobol or Pascal or some other language. Look at the advertisements and see how few at the programmer level actually ask for more than one procedural language. And even fewer really require more than one in practice.

CCE's ability to prepare its students quickly to be able to face real job situations is the school's real breakthrough. CCE has picked up the accepted concept of sandwich courses and lets industry use the Cobol students without having to pay them (provided only that the company continue to let them work in a Cobol environment).

Doubled Supervision

Some classroom work continues, of course. Supervision of the student is effectively doubled — a company can always drop a trainee or the school can discipline him as needed, or both. However, from the student's viewpoint, he not only gets programming experience, but can also discuss with his instructor anything that seems not to jibe with what he was taught. That is a type of feedback I like.

What is important for the DP training industry is to consider whether this narrower more concentrated approach improves or reduces the vocational chances of the graduates. For this I went to the records.

Understanding the graduate records of vocational training schools is not easy, and comparing them is usually an exercise in futility. Records are usually kept for graduates who are placed into "course-related" positions. A person who has trained in programming can be counted as successfully placed if he gets a data-entry position that involves entering programs. Or a person whose course has been 90% programming, but also includes 10% computer operations, can be classed as successful if he becomes a tape jockey!

No White Lies

The CCE records, I found, did not need to rely on any of these white lies. About half of the interns took programming jobs with the firm for which they interned and most of the others were successful in finding other programming jobs.

The success was not just for a single course or a single year, either. The school, which operates in four centers in Massachusetts and is headquartered at 62 Irving St., Framingham, MA 01701 — is now in its third year, and I went through all prior records.

There is still some possible doubt as to whether concentration and internship experience is universally the best way to go.

CCE has other unique aspects going for it such as its location (near Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc., Honeywell, Inc. and Prime Computer, Inc.) and the personality, training background and negotiation skills of its president, Daniel Beresford. Real proof of the approach will have to wait until it is used elsewhere, but it seems to be a step beyond the training courses I saw in the '70s.

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READER COMMENTARY   Anthony F. Vignone

Modular Developments Improve Program Design

In his In Depth article on software engineering [CW, Nov. 12], Gopal Kapur centered in on the fundamentals of proper program design and captured some of the essential ideas of designing verifiably correct programs. His illustration of an update program provided the reader with an excellent example of code-independent design.

Recent developments in modular design initiated by Niklaus Wirth (presented at the Ninth Institute in Computer Science at the University of California, August 1979) suggest some improvements to Kapur's approach. I will illustrate their application with the same update example and use Kapur's notation as defined in his article.

The new modular developments Wirth described can be summarized as follows:

• A large program must be factored or partitioned into smaller parts with "thin" connections. The walls between the modules are regarded as impenetrable except for a selected minimum set of communication entities, some imported and some exported.

• The factoring process is not arbitrary. It is guided by the new concept that module structure concerns only the scope of its entities, not the semantics of the program. The module is therefore characterized by the *data* it contains (or the entities the data represents), rather than by its set of procedures.

• Hence, the recognition of the structure of the data involved is the key to finding the appropriate decomposition of the program.

The implementation of a Wirth module in Cobol does not necessarily imply a physical module; that is, a separate compilable module. In fact, the example will illustrate that the implementation of two modules can simply be two logical parts of the same program (two sections, if you will).

Kapur's solution *combines* two entities, transactions and master. Wirth's ideas suggest that they remain separate and be used to define two separate modules (program parts). The design illustrated here will, then, separate these entities and define the "thin" connections.

First, choose which entity (transaction or master) upon which to base the update. This is an easy choice — pick the transactions. The solution will then be *independent* of the physical structure of the master (sequential, Isam, data base and so forth).

Second, the transaction entities are described in an "entity or logical data structure" as shown in Figure 1. This diagram is read similar to a Warnier data structure chart.

The diagram reads and verifies as follows (from top, down):

1. The transaction file contains many transactions. (true)
2. Each transaction contains a key and an action code. (true)
3. The action code is either an A, C or D. (true)

As you can see, our verification process is not a mathematically rigorous one, as Dijkstra would require. I do not, nor does Kapur, suggest to impose such rigor. We merely require clear self-evidency of the arrangement and relationships of the entities. It is upon these relationships that the program will be based using Warnier's rules. (Note: I might agree with Dijkstra rigor for programs used in life-and-death situations such as air traffic control, skylab reentry and so forth.)

Warnier's rules can be summarized as follows: Allocate functions to each entity in the data structure maintaining the same relationships. As a result, the program structure will display the same underlying structure as the data.
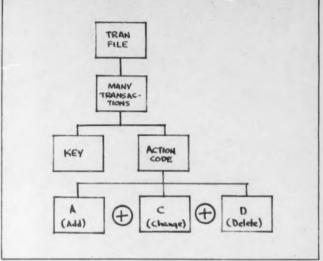
Figure 1
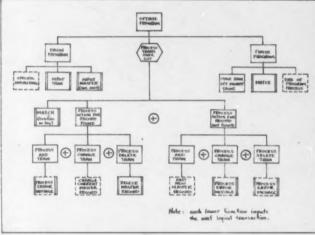
Figure 2

Figure 2 shows the resulting update program — our first Wirth module. It is read from top to bottom and from left to right. This update model is now truly universal. We don't end up with separate models for each master file structure as Kapur did.

The function allocated to the entity, transaction key, is called "Match" in the diagram. This function is concerned with the other main entity, the master. It will become the other Wirth module. It is required to define this module in terms of the interfaces with the first update module. These interfaces are the "thin" connections referred to earlier, and we are looking for a minimum set sufficient to give full meaning to the update module. The "match" module can therefore be defined as follows:

• Function — Match.
• Import from update module — transaction key.
• Export to update module — found flag, master record if found.

It only remains to implement this module for each specific master file. Again, the intent is to implement the Wirth module in the same program; that is, not as a separate compilable module, but rather as a separate logical section of the program. In Figure 3 (see Page 30), the module for an Isam-type file is shown to be trivial. Figure 4 shows a more complex solution for a sequential master file.

Implementation of the I/O commands in the main Update module in Figure 2 will obviously depend on the

Recent Developments Improve Program Design

Figure 3
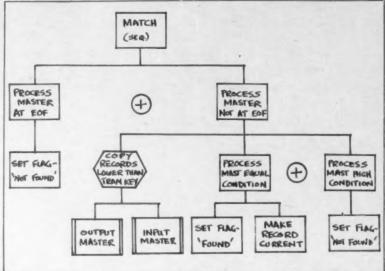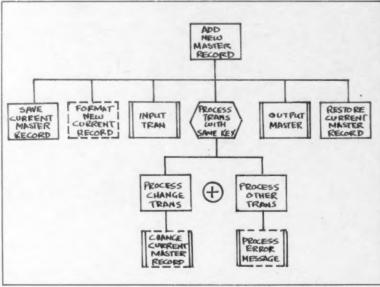
Figure 4

Figure 5

master file's physical structure. Example — the DELETE function would use a RE-WRITE of the record with a purge code for Isam and a READ command for a sequential file.

Any special editing for a required order and content of multiple transactions on a single master record is to be contained in the Add, Change and Delete functions and not dictated by the main logic of the program.

Add Example

As an example, suppose the user requires that an Add set of transactions to establish a master record is to be as follows:

• One Add transaction.
• Multiple Changes may follow the Add.
• A Delete is not allowed.
Figure 5 illustrates a sample

implementation and, again, is independent of the physical nature of the master file.

I strongly agree with Gopal Kapur that these methodologies are a significant step toward elevating software design. More important, refinements to a sound methodology can now be made with refreshing confidence in their correctness.
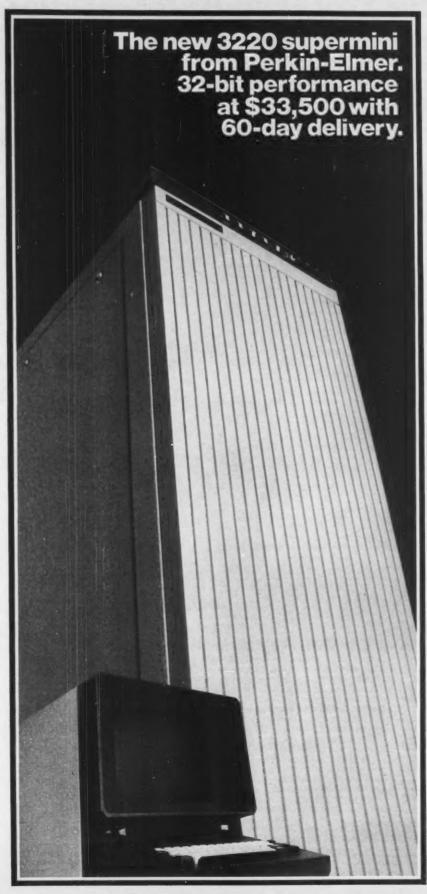
Vignone is a DP consultant based in Vernon, Conn.

Teams Need Players

master plan, the process can never totally stamp out unforeseen demands for systems support; but it can surely help cut these panic cries down to manageable proportions.

Unfortunately, too few DP departments are operating in this fashion. Many top executives equate systems development with programming and are infatuated with the fantasy that a system can be created and/or modified with a mere flick of a programmer's "Bic." As a result, they *still* continue

to "straightjacket" the DP department with time schedules and resource levels that are totally unrealistic.

A major reason for proposing a "reorg" as part of the solution to the planning problem is that a varsity DP player is needed on the executive team to indoctrinate bosses with thoughts about proper long-range planning. This is so important in putting some sort of cap on the already extant waste of critically needed (and oh-so-expensive) DP resources.

What Makes a Good Programmer?

Now we have an era of programmer certification. There's the Certified Data Processor exam and the Association for Computing Machinery's self-assessment program. Do we know how the results correlate with on-the-job performance across a variety of applications? It sure seems like we ought to, but I haven't seen any study results.

Not much else has been tried. Evaluating programmers has been sort of like judging paintings — "I may not know much about art, but I know what I like." The result may be personally a esthetically satisfying in the art world — and then again, it may not — but in the programmer world it leads to a kind of educated cronyism. There is the nagging question, "Are our 'best' programmers *really* our best programmers?"

The stakes are high. If we are misjudging our best people, then we are probably misusing our best people. But to make the stakes even higher, the whole issue is enlivened with some methodological questions. Does Weinberg's "egoless programming" (WEIN71) really make sense? Should programmers work in chief programmer teams, or as collections of individuals or in a more traditional hierarchic or-

ganizational harness?

Is Kraft's fear of the "routinization of computer programming" (KRAF77) valid? Have we ever measured the difference between the craftsman and the routinized approach, as I have facetiously suggested (GLAS78)?

And what of quality? Software quality, already a difficult-to-measure but vitally important entity, may be inextricably tied to individual ca-

pabilities. What happens to a software quality assurance program if that is true?

What happens on a 400-programmer project if that is true? Must large projects function at a level of common mediocrity in order to succeed? And if so, can a creative, hard-charging individual function (either as a technologist or as a person) in that environment?

That's a lot of questions. The ultimate question is, what's being done about answers? Fortunately, some work is being done. At the 1979 National Computer Conference, there was a session on "Software Psychology: Exploring the Human Factor." The papers were interesting, with titles like "First-year Results From a Research Program on Human Factors in Software Engineering." But most of them were methodology-first explorations; for example, "The Effects of Modern Programming Practices on Programmer Efficiency" and "Prediction of Programmer Performance From Software Complexity Metrics." These are laudable and vital studies. But they dodge what is beginning to look like the more important human factor issues.

• We need to know *why* some programmers are an order of magnitude better than others.

• We need to know *what* those exceptional programmers do differently.

• We need to know if the results of the why and what explorations can undergo a human technology transfer from the exceptional to the needy.

Given the results of these studies, then maybe the promise of the first paragraph of this article can make sense.

Footnotes

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(BUCH75) "Maintenance of the Computer Sciences Teleprocessing System," *Proceedings of the International Conference on Reliable Software,* 1975; Bucher
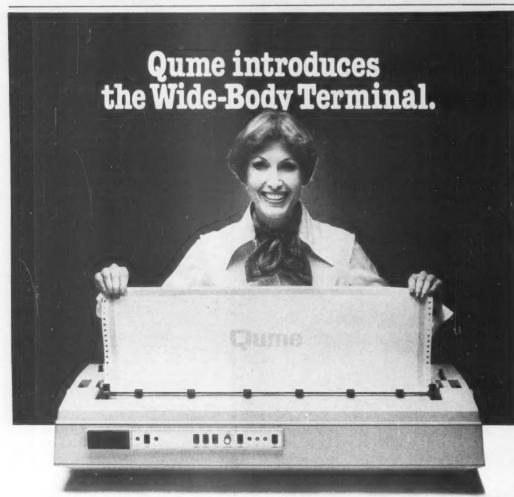
(FRAN79) "The New Software Economics," *Computerworld,* 1979; Frank

(GLAS78) "Will the Real Henry Ford of Software Please Stand Up," *Computing Trends,* 1978; Glass

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Eleven Categories
Software Selection Criteria Outlined

By Craig Johannsen
Special to CW

Nearly all objectives for software products fall into one or more of the following 11 categories: functionality, capacity, flexibility, usability, reliability, security, performance, serviceability, ownership, minimization of operating and maintenance costs and minimization of purchase and installation costs.

The categories are certainly not mutually exclusive. For example, functionality, performance and capacity are often strongly interrelated. But each category suggests its own criteria for evaluating software packages relative to overall corporate objectives. Some examples, by category, follow.

Questions relating to *functionality*, for instance, should include:
• Do the input transactions, files and re-

This is the second part of a two-part article on evaluating software packages. Part 1 stated a case for relating evaluations to overall corporate objectives rather than selecting products based on their features alone [CW, Jan. 28]. Part 2 specifies objectives that every software package should satisfy.

---

ports contain the necessary data elements?
• Are all necessary computations and processing steps performed the way you want

them performed?
• Are the types of ad hoc inquiries the ones you would like to make possible?

When considering *capacity,* find out if the product will be able to handle your requirements for size of files, number of data elements, number of table entries, volume of transactions, volume of reports and number of occurrences of certain data elements. Also determine whether response or turnaround time will be adequate. Check all limitations.

About *flexibility:*
• Can transaction and report formats be changed easily?
• Can screen layouts be changed easily?
• How easy is it to add new computations or processing steps?
• Can the programs be adapted to new applications?

Factors to be considered in *usability* include:
• Does the level of technical knowledge required to use this product properly match the level of knowledge of those who will be using it?
• Is the user documentation complete, easy to read, easy to understand and up-to-date?
• How readable, informative and easy to interpret are the reports and screen displays produced?
• Is training available from the vendor?
• Will the users be enthusiastic about this

Cincom Provides OS, DOS Users With On-Line Editor/Library System

CINCINNATI — An on-line editor and library system for OS, DOS and compatible operating environments that combines online program development and testing, operations control and editing capabilities was introduced by Cincom Systems, Inc.

Called Series 80 LMS-II, the system offers an alternative to batch program development products adapted for a teleprocessing monitor, a Cincom spokesman said.

LMS-II runs on IBM 370 — Model 115 and above — 30 series and 4300 mainframes and replaces Cincom's on-line Library Maintenance System (LMS). Conversion utilities are provided to automatically unload LMS libraries and reload to LMS-II.

LMS-II offers several features not included in LMS, the spokesman noted. These include on-line printing capability, ability to enter jobs directly into the host system for production control and scheduling, ability to view submitted jobs on the terminal without waiting for hard-copy output to check programs and capability to perform logical deletes instead of manually deleting statement-for-statement by reentering data.

Up to 240 Libraries

When used as a library system to maintain and develop source programs, LMS-II lets users define up to 240 libraries whereas, with LMS, users could define only one, according to the spokesman. LMS-II supports Pansophic System, Inc.'s Panvalet, The Librarian from Applied Data Research, Inc. and standard system libraries.

Other features include automatic audit trail and restore facilities, in addition to the password sign-on security provision available on

LMS, and full-screen editing as well as line-by-line entry and editing. Editing functions include string search and replacement and forward and backward paging.

For DOS users, LMS-II uses between 160K and 180K bytes of memory, of which between 60K and 80K bytes are real memory, the spokesman estimated. Under OS, the

On V-8000 Series CPUs
NCR Puts Tran-Pro Under VRX

DAYTON, Ohio — NCR Corp.'s Tran-Pro transaction processing monitor now can be used with the firm's Virtual Resource Executive (VRX) operating system to run on all V-8455 and larger V-8000 series mainframes.

Previously, Tran-Pro operated in the non-virtual NCR Century system environment on Century series and the batch-oriented N-8000 series computer systems. The original Tran-Pro also ran under VRX on N-8000 and V-8000 series CPUs, but only in a non-virtual mode, an NCR spokesman said.

Besides operating in a virtual systems environment, the event-driven VRX Tran-Pro offers other features not included in the earlier version of the software. Among them: automatic validation procedures, faster systems generation — reduced from an average of several hours to less than one hour — and "more flexible" formats through automatic message logging, for example, the spokesman noted.

These capabilities are in addition to the

basic Tran-Pro modules for systems security, decoding format control, backup/restart/recovery and interfacing between applications programs and on-line data base management systems.

NCR would not indicate how much memory VRX Tran-Pro uses, but described as a minimum system configuration a 512K-byte V-8455 processor with the VRX operating system, VRX Tran-Pro and VRX Total, a version of the data base management system developed by Cincom Systems, Inc. and adapted to VRX.

VRX Tran-Pro licenses for a one-time fee of $25,475 plus an annual software maintenance charge of $1,500 or for $675/mo including maintenance under the monthly license plan. By comparison, the earlier version of Tran-Pro carried a one-time license fee of $22,000 plus $960 a year for maintenance or licensed for $555/mo with maintenance included.

NCR is at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

On-Line Accounting Packages Compatible With System/34

MARINA DEL REY, Calif. — International Management Systems Corp. (IMS) is now delivering on-line versions of its accounts payable and fixed assets systems. In addition, an on-line version of its financial reporting/general ledger system is scheduled to be available in March.

Written in IBM's RPG-II, the programs are said to be compatible with IBM's System/34. In addition, IMS says it will offer the same programs in RPG-III for IBM's System/38 processor. Those systems, which were delayed six to nine months by operating system glitches, are scheduled to start delivery in July.

An IMS spokesman said the company will address conversion from RPG-II to RPG-III in two ways. Users can take the RPG-II programs and use an IBM supplied translator to convert to RPG-III, or they can get RPG-III-coded programs directly from IMS. Those RPG-III programs aren't available yet.

The RPG-II version of the fixed assets program costs $3,500; the accounts payable package, $4,500; and the financial reporting/general ledger system, $7,500. Prices aren't yet available on the RPG-III versions, the vendor said from 4676 Admiralty Way, Marina Del Rey, Calif. 90291.

HP 3000s Gain Package For Materials Management

CUPERTINO, Calif. — Hewlett-Packard Co. has introduced a materials management applications package that reportedly can be installed and modified by the user without the need for traditional programming languages.

Designed to run on HP 3000 business minicomputers, the on-line, data-base-oriented Materials Management/3000 replaces HP's earlier MFG/3000, which was offered as a standard package or as a code-modifiable version. "If a user wanted to modify MFG/3000, we sold him the source code," an HP spokesman said.

By comparison, Materials Management/3000 treats user modifications as data and not as program code through use of an "applications dictionary" that includes many of the aspects of a system users generally want to customize — for example, definitions of security, data fields, data entry screens, HELP messages, report formats and processing sequences. User changes, therefore, will not affect HP's ability to maintain the software, the spokesman noted, adding that software updates, error corrections and system enhancements from the factory will still apply.

Materials Management/3000 also provides what HP calls an "applications monitor," said to automate the customer interface so users can interact with the applications software entirely through CRT terminals without having to interact through machine code with the operating system.

Among the materials planning and control tools offered are master production scheduling; rough-cut resource planning (to test schedules against known resource bottlenecks); bills of materials; routings and workcenter (to relate each workcenter's function to the materials routings needed to support it); materials issues and receipts; inventory balance management; work order control; purchase order tracking; and materials requirements planning.

Two additional applications modules not previously available with MFG/3000 provide for handling multiple stocking locations and updating engineering data fields on-line.

On large configurations, more than 1,000 transactions per hour with terminal response time less than 5 sec is "a reasonable expectation," the spokesman said.

Compared with an $18,500 license fee for the standard MFG/3000 package, Materials Management/3000 licenses for $25,000 including software and manuals. The right to copy for each additional HP 3000 computer costs $5,000. Standard customer support service costs $320/mo.

Including the Materials Management/3000 package, a "typical small" 1M-byte HP 3000 with four terminals is priced at $86,500; a 2M-byte system with eight terminals costs $167,500. MFG/3000 users can upgrade to Materials Management/3000 free of charge.

Deliveries are running 16 weeks, HP said from its General Systems Division, 19447 Pruneridge Ave., Cupertino, Calif. 95014.

To Gain Financial Control

System Lets County Consolidate 50 Agencies

WAUKEGAN, Ill. — "We proved just how disjointed our county financial activity really was when we garnisheed our board chairman's salary.

"Very quickly we received a lot of executive attention regarding our interest in installing a comprehensive financial system."

Those are the words of Randall Murphy, assistant director of the Lake County, Ill., Department of Management Services, who explained, "We had 50 different departments following different sets of financial standards."

In a local government the size of Lake County, with 400,000 registered voters and a fiscal 1980 budget of $66 million, financial controls are often strained. Lake County has a monthly payroll of 2,300 people, prints about 400 accounts payable checks weekly and provides financial information to 100 agencies regarding the same amount of funds.

"It was a real problem when individual departments developed separate financial systems. We had a lot of duplication and overlap and, in fact, increased our data processing activity nearly 200%," Murphy pointed out. "It became clear to us we had to get a handle on financial management."

The Lake County administrators concluded a financial system was needed to address its problems of diversity and to force accountability on different reporting groups. "As an example," Murphy said, "we are responsible for county courts. There are many different collected court fees; in the past, these fees were reported and processed under the guidance of elected officials who didn't necessarily have any experience in accounting practice and technique.

"Consequently, they would develop their own accounting systems. We had to deal with these diverse systems.

"Although we don't have a policy that specifically outlines whether we must build or buy software, we do participate continuously in transfers, particularly at the design level," Murphy said. "If we can define the problem more clearly by using someone else's experience, then we can save ourselves some cost and trouble."

The Search Begins

Two years ago, Murphy and other administrators at Lake County began to amass information on financial systems. Their search started with system evaluations done by survey-organizations and research groups, information gleaned from financial system users and vendors and reviews of trade and business journals. They also developed a list of sites from which to consider transferring applications.

"When we were looking two years ago, there weren't many successful integrated financial systems. There were a lot of plans, a lot of talk, but not much in the way of actual products," Murphy recalled. "After we reviewed our inventory, we came to the conclusion that there weren't any other sites with an integrated system capable of transfer. The vendors either did not have a significant commitment to local government or they were not current in terms of DP activity.

"We evaluated packages rather selectively. We didn't want to 'reinvent the wheel,' so to speak."

A late entry in Lake County's study was the local Government Financial System (LGFS), developed and marketed by American Management Systems, Inc., based in Arlington, Va.

"At the time, the AMS system appeared to be reasonably concurrent, with the right technology and company support," Murphy said.

Functions Drawn Together

LGFS was up and running in three months; it has been operating in Lake County for one year. LGFS is starting to draw some of the divergent functions together. It currently does budgeting, encumbrance control, expenditure accounting, accounts payable, cash disbursements, revenue accounting and payroll accounting in compliance with Governmental Accounting, Auditing and Financial Reporting principles, published by the Municipal Finance Officers Association.

The Lake County computer site switched recently from an IBM 370/-148 in a DOS/VS environment to an IBM 3031.
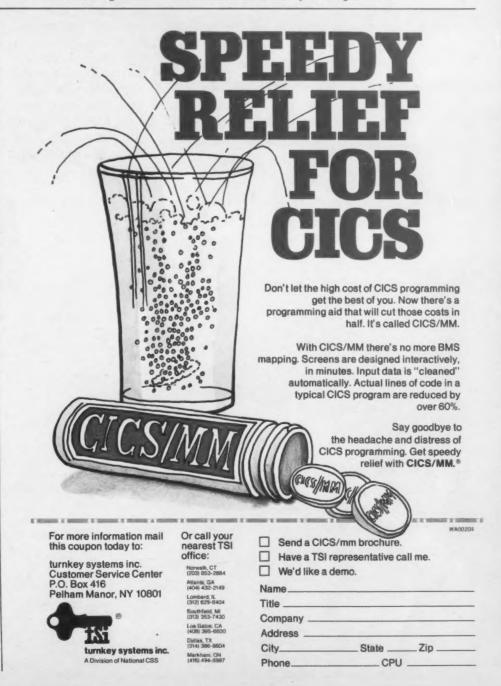
Murphy, who feels Lake County employees could not have designed a system with the insights already incorporated in LGFS, believes the county is now in a more realistic financial environment. "One of the key advantages of LGFS is its dependence on control with its required control mechanism. Another advantage is its adherence to table maintenance discipline.

"As a result, we've reduced our vendor payments to one to three weeks, down from as many as eight weeks. Needless to say, our vendors are considerably happier."

For the future, Murphy predicted rapid changes in local government financial activities.

"What we did one year ago is already outdated. Our financial systems have to have the ability to adjust to these changes," he said.

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Simplicity. That's the key to Hewlett-Packard's HP 250 small business computer. It's easy to use. And just as easy to program. A variety of HP software enhancements and programming aids help you reduce the time and effort it takes to develop applications. So you can speed up delivery times to your customers. And that can pay off in a bigger bottom line for you.

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FORMS/250 and REPORT WRITER/250 give you the software you need to get the most out of the system in the least time. And the HP 250's attractive, user-oriented features will make *any* operator feel right at home. The typewriter-like keyboard, adjustable video screen, and menu-driven soft keys make it easy for the user running a program or the designer writing one.

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37901 HP FC6

HEWLETT PACKARD

Eleven Criteria Outlined for Choosing Software

product?

Turning to *reliability*, the following considerations bear examination:

• Does the product have a clean, modular design?

• Has it been in actual use long enough to make sure that most of its bugs have been cleaned up?

• How much of the system will become unusable when a part of it fails?

• Does the product rely on any failure-prone hardware or noisy communication links?

• Does the product incorporate any features for the detection and self-correction of errors?

• Are there errors a user can make which will bring down the system?

• What are the recovery capabilities?

On the question of *security*, find out:

• Does the product incorporate standard types of controls?

• Does the product permit adequate backup procedures?

• Does it assist in any way to prevent intruders from extracting sensitive data from files or transaction input streams?

• Does it help prevent employees from entering unauthorized transactions or running programs without authorization?

• Does the product provide adequate detection and diagnosis of data entry and other types of errors?

• Are transactions journalized?

• Is a standard procedure provided that can be used to verify that the system is functioning properly?

About *performance*:

• At what rate will the product typically use machine cycles?

• At what rate will it be requesting disk accesses?

• How much main memory will it require?

• If it will be run on a virtual memory system, how much paging activity will result?

• How many users can be on the system before it begins to bog down?

Opinions of present and past users and of professional consultants may help in this area.

Another area, *serviceability*, calls for the following:

• Are the source programs available? Often they aren't.

• If the vendor will be doing maintenance, how reliable and accessible is the company? Some vendors operate out of post office boxes!

• What level and quality of maintenance will the vendor supply? Is this guaranteed in writing?

• Will changes to the system invalidate the warranty?

• Can the product easily be used in another operating environment? That is, is it portable?

• If your staff will be doing the maintenance, are the programs written in a language with which your staff is familiar? Does it use techniques with which staffers may not

be familiar?

• Are sets of test data available with adequate documentation of how to use them and of what results to expect? Obtain the opinions of past and present users.

On *ownership*:

• What kind of rights to the product are you buying?

• Can you resell or rent the product to someone else?

• If the vendor is making this product especially for you, will it also be marketed to others? If so, will the vendor pay you a royalty on each sale?

• Are there restrictions on copying the product or its documentation?

• Are there restrictions on the purposes for which the product may be used?

• Will you be able to obtain full ownership rights and copies of the source programs if the vendor goes out of business?

With an eye to *minimizing*

operating and maintenance *costs*, ask:

• How much does the vendor charge for maintaining and upgrading the product?

• How frequently will maintenance probably be required?

• What is the cost per transaction of using this product?

• What will the storage costs be?

• Will purchase of this product require acquisition of additional hardware or personnel? How much will they cost on a continuing basis?

• What will be the usable life span of this product?

Finally, to *minimize purchase and installation costs*, you should know:

• What initial costs are there besides the basic costs of the product?

• Will you have to pay shipping costs? Transportation and lodging costs of the vendor personnel who will install the system and train your staff?

• Will there be considerable delay between placement of the order and actual delivery of the product in a ready-to-use state? How much will this cost?

• What will conversion costs be?

Any list of objectives should include items from each of these 11 categories. If any one of them is neglected, the adequacy of the evaluation must be suspect.

Johannsen is president of ABX Automation Consulting Ltd. in Vancouver, British Columbia, Canada. The firm develops software packages, specializing in DP productivity aids and personnel assessment tools.

On-Line Editor and Library Aimed at OS, DOS Users

system uses from 220K to 240K bytes and, out of that, the same amount of real memory as for the DOS version.

The vendor claimed LMS-II saves about 60% of the disk space normally required for systems libraries because data is stored in a fully compressed mode — that is, redundant characters such as four or five blanks in a row are reduced to three characters, the first indicating the type of character compressed and the last two indicating the number of redundant characters.

LMS-II is also said to reduce work loads on the central printer and on the data entry department. All compilation, core dumps and test results can be viewed on-line, canceling printing hard copy if not required.

Internal Test

To quantify these claims, Cincom cited results from internal use of LMS-II, which was installed three months ago in its DP department to replace IBM's VM/CMS for use with the department's 370/-145. According to the spokesman, programmer productivity increased about 30% as measured in number of lines of code written and tested, rising from 18 lines per day to 24 lines per day.

In addition, the number of lines printed for testing and compilation dropped by about 50% from 220,000 lines per day to about 100,000, and the number of test runs per day increased from 180 to 350, he

claimed.

LMS-II also has been installed and tested at four beta test sites, replacing such systems as IBM's ETSS-II and SPMOL. Compared with the latter product, LMS-II required 80% fewer printouts to be run for testing purposes, Cincom reported.

For OS users, LMS-II costs $17,500 plus an annual usage charge of $1,750 covering maintenance and updates after the first year of use, or leases for $425/mo. The DOS user price is $15,500 plus a $1,550 annual usage fee, or $375/mo.

For leased or purchased systems, installation costs $1,500. Installation, including physical installation, training and practice, usually takes less than two days, the vendor claimed.

LMS users can lease LMS-II at no extra charge or apply the entire LMS purchase price — $9,600 for both OS and DOS systems — to the purchase of LMS-II, Cincom said from 2300 Montana Ave., Cincinnati, Ohio 45211.

Ledger Fits Management, Auditors, Government

OTTAWA — Northern and Central Gas Corp., Ltd. (NCG) is a natural gas distributor that directly serves 105,000 customers in Ontario. It serves 304,000 customers in parts of the provinces of Quebec and Manitoba through subsidiary companies.

When NCG started looking for a new general ledger system in early 1977, it was using a system it had developed internally for a Honeywell, Inc.

mainframe, later converting it to an IBM 370/115.

According to Lynn Evans, supervisor of financial statements, "There were so many changes made to the original program written for the Honeywell that when the program required modificiation, we really weren't sure how the change would affect other portions of the system. Management became very concerned that the system would

go down completely one day."

The company evaluated its alternatives — revamping the converted system, rewriting a completely new system or buying a software package — and decided to buy a package. Data processing and accounting looked at three vendors before deciding on Release 19 of the General Ledger System from Management Science American, Inc. (MSA) in June 1977.

Changing Needs

"Our information needs had changed," according to Joe McConkey, manager of plant accounting and inventory control. "Our old system was producing consolidated reports that were way out of date, and we had to type many of them manually.

"We wanted a system we could change whenever management, auditors or others wanted to access new information or to present existing data in a new format. We thought MSA's system was flexible and liked its reporting features."

In addition, NCG needed a system that would allow it to respond effectively to the Ontario Energy Board (OEB), which is the provincial government agency charged with energy rate regulation. "When you go in for rate hearings and the board is looking at your costs, you have to file whatever information it wants," McConkey explained.

"For our internal use, we added four-digit cost-type identifiers at the end of the three-digit code of accounts specified by the board. Then we developed a set of consolidated financial statements that are produced on an as-required basis for the four subsidiaries that are regulated by the Ontario Energy Board.

"We feel this gives us the flexibility to produce any type of consolidated statement the OEB may request," McConkey said.

Current Uses

NCG currently uses the statistical capabilities of the system to keep track of the number of customers and the volume of gas sold both by region and for the total company, as well as to reflect average dollars per unit volume. Custom reporting techniques are used to calculate dollars per volume in cubic feet and convert the data to cubic meters.

"We had a mandate from management to provide department managers with at least what they were getting from the old system. Once this was accomplished, we would add additional refinements later.

"Management was getting good reports from the old system, so that's what it wanted

in the new one," McConkey said. "And that's what it got, plus a lot more."

McConkey is pleased with the system's ability to generate general reports before it closes each month. A review of NCG's financial position prior to closing with its old system had been such a time-consuming process that it was done only at year-end. Now there is a preliminary closing done each month that helps analysis activity and the calculation of monthly income tax entry.

Cost Allocation

"All our vehicle costs are cleared through our operating and capital work order system, which we incorporated into the general ledger system. These costs include, among others, expenditures for gas, maintenance and insurance," McConkey said. "Costs are allocated back to the jobs the vehicle was used on during the month through the level reporting capabilities of general reporting, he explained. As a by-product, we're capturing costs on more than 370 vehicles." NCG also keeps cumulative year-to-date information over the life of the vehicle and is considering using statistics to do long-range analysis of costs.

The company currently budgets down to summary cost-type levels. McConkey feels there is growing support to get the budget down to the individual cost-type level.

"Presently a department manager would budget $10,000 for total contractor services, with his actual costs being captured by the individual contractor," he said. "Some of the managers would like to budget down to the contractor level. It'll take a little time, but we'll get there."

French Version

Evans defined several reports in French for the utility's Quebec subsidiary. "The column headings aren't changed, just the descriptions within the body of the report," she said. "We simply modeled them after our regular reports and substituted the appropriate descriptions in French."

NCG implemented the General Ledger System live in January 1978 — without doing a true parallel run. "We just ran out of time," McConkey recalled.

"From July to January we set up the general ledger and budget modules. When we put the 1977 history up, we took the net monthly change for each account, loaded those figures into the system and let it calculate the new balance.

"These balances were compared to the original 1977 financial statements. We

thought that by entering the 500 net monthly change transactions and reviewing the new reports, live data starting in January 1978 would produce the same desired results. Fortunately, this was the case," he said.

Training Tapes

Evans believes the audiocassette training tapes MSA provided were very helpful throughout the implementation process.

"They were excellent. Before we put up the system, we sat down, listened to them and set up a dummy company with two subsidiaries and approximately 1,000 account/center combinations. We played with the dummy company, produced several reports and worked with the statistical features until we felt confident enough to start on the real thing.

"It worked well for us, but I wouldn't do it again in only five months.

"Another success we've had in using the cassettes has been to train people who are new to the system," Evans said.

User's Workshops

The system really lends itself to users, according to McConkey. "We participate in all of the Cufam [the MSA ledger users' group] meetings because it's a good time to learn about new system features as well as to meet people who may be able to relate their experiences with portions of the system we haven't used yet. The MSA-sponsored workshops are really well put together."

Both the accounting and data processing users at NCG have praised the system's documentation. "Our systems people say the data processing documentation is excellent," McConkey said. "And once you understand the system and know what you're looking for, the user documentation is quite easy for an accounting user to access.

"Best of all," he added, "we've fulfilled management's mandate. We gave it the reports it was satisfied with before — plus much more. The system's reporting features should allow us to respond to any information requests that arise in the future."

COMMUNICATIONS

Promise Faster Setup, Lower Fees
TRT, WU Offer International Telex

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — An international Telex service promising faster call setup and substantial rate reductions for some users was announced here recently by TRT Telecommunications Corp. and Western Union Telegraph Co. (WU).

The Express International Telex Service (Eits) will begin April 10 if no competitor objects. Eits subscribers must pay a $95,000 minimum usage charge annually, so only those who make heavy use of international Telex are in a position to benefit.

The service consists of a 50 bit/sec point-to-point circuit connecting the customer with TRT's international switching center near Miami, plus a varying number of additional point-to-point or switched circuits that range in speed from 50- to 4,800 bit/sec. Each circuit links the customer's termi-

nal to WU's Infomaster center in Middletown, Va., or to TRT's switching center.

The point-to-point circuit was designed to dispatch outbound messages and deliver inbound messages immediately. If a customer wants store-and-forward service, its international Telex messages travel to TRT's switching center by way of Middletown.

The latter service will intitially be available only for outbound traffic, a TRT spokesman said. Store-and-forward capability for inbound messages is "under development."

Eits gives the customer a partial backup capability, since it can send international Telex messages over either route. Moreover, the service links the user, through common circuitry, to other WU and TRT offerings — such as WU's Mailgram, domestic Telex and telegram services and TRT's marine telegram service.

"International Telex traffic to be provided under this tariff will not traverse the domestic Telex and TWX networks," TRT added. "Since intermediate domestic switching will be eliminated . . . a superior grade of service will be provided to customers transmitting . . . on a real-time basis."

PE Superminis Gain Controller

OCEANPORT, N.J. — An intelligent communications controller for Perkin-Elmer Corp.'s 7/32, 8/32, 3220 and 3240 series of 32-bit computer systems is available from the vendor.

The Direct Memory Access I/O Subsystem (Dios) provides direct memory access facilities between main memory and PE's hardware communications adapters. With Dios, data transfers take place without processor intervention, improving system throughput while minimizing processor degradation, a spokeswoman claimed.

The subsystem reportedly enhances Perkin-Elmer's Reliance software package, which includes data management and transaction processing software using Ansi Cobol 1974. Reliance supports up to 128 terminal users, rendering data integrity through automatic record locking, on-line transaction rollback and systemwide recovery features.

Dios also supports the IBM bisynchronous protocol and allows PE's high-level data communications software, including IBM 2780/3780 emulation and Hasp, to operate through the intelligent controller without

modification, according to the spokeswoman.

Further, Dios supports chained or queued buffer handling in a bi-synchronous environment, she continued. Device status checking and frame check sequence generation/validation are also featured.

In conjunction with PE's ZDLC Channel Terminal Manager software package, Dios provides support for Synchronous Data Link Control, High-Level Data Link Control and the Advanced Data Communications Control Procedure, PE said.

Dios handles transmissions up to 56K bit/sec per line; the controller's peak throughput was said to be 100,000 char./sec.

Two versions of the controller are available. The first enhances the Reliance package and costs $6,000 in the U.S., according to the spokeswoman. The second version is aimed at users with concurrent data communications needs and has a domestic tag of $7,500, she noted from PE's Computer Systems Division at 2 Crescent Place, Oceanport, N.J. 07757.

Leatherneck Link

The U.S. Marine Corps has taken delivery of four "shelterized" data communications systems in a single facility (above) from Rockwell International's Collins Division. The AN/TYQ-3A has its own central processor to switch messages among air defense units of the Marine Corps and the multinational North Atlantic Treaty Organization. A second AN/TYQ-3A will enlist this March, Collins said.

Deadline Approaching

The deadline for contributions to the March 31 *Computerworld* Special Report on data communications terminals is fast approaching. Don't delay if you can offer tutorial essays, accounts of user experiences, reviews of current products and speculations about the future that are germane to the report's theme: the trade-offs between smartness and dumbness.

The report will suggest how users can decide whether their environment warrants programmable terminals or lower priced gear.

Texts should be no longer than six double-spaced, typed pages. They are due by mid-February, according to the report's editor, Brad Schultz at CW, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Pacnet Offers 50- to 2,400 Bit/Sec Within U.S.

DALLAS — Pacific Network Communication Corp. (PNC) has begun to offer Pacnet — a dedicated digital communications service — throughout the U.S. at speeds from 50- to 2,400 bit/sec.

Certain cities can be linked at up to 4,800 bit/sec, PNC said, including

from Oakland, Calif. and Dallas to Honolulu.

At both 2,400- and 4,800 bit/sec, Pacnet offers support for a variety of protocols, including IBM 2780, 3270, 3780, 360/20 and 360/30 systems working under a Hasp workstation environment, Honeywell, Inc. GRTS,

Control Data Corp. UT-200 and both IBM and Ascii asynchronous codes.

Two Categories

Two types of channel offerings are provided, Category I, in which all speeds of service are provided, and Category II, in which 50- to 300 bit/-

sec service is available.

The entire system is ground-based, which PNC considers an advantage because it circumvents satellite propagation delays. This is important when the user employs the communications system for on-line polling functions, the firm said.

Service Costs

The service costs $40/mo for a 50- to 75 bit/sec channel for the first mile and 36 cent/mile for every additional mile up to 200 miles. Reduced rates apply as the distance between communications points increases.

At 1,200 bit/sec, the first mile costs $55/mo plus 57 cent/mile up to 200 miles. The installation cost is $250.

Channel connections between selected cities, such as between Oakland and Honolulu, are charged at a flat monthly rate. For example, the 50- to 75 bit/sec rate between those two cities costs $250/mo, with a $200 installation charge.

A 1,800 bit/sec communications link costs $1,300/mo with an installation charge of $250, according to PNC.

The firm is located at 2732 Seelco St., Dallas, Texas 75235.

Unit Converts Protocols to Hasp RJE

AUSTIN, Texas — A protocol converter that communicates with a host mainframe via IBM's Hasp remote job entry (RJE) protocol for binary synchronous traffic is available from KMW Systems Corp.

The BAC-Hasp protocol converter performs error-checking and correction functions, translates Ebcdic code to Ascii code and vice versa and interfaces with user-attached devices in serial asynchronous or byte parallel formats, KMW said.

With the BAC-Hasp, the vendor con-

tinued, multileaving allows console support, duplicate character compression and bidirectional communications — permitting multiple input and/or output devices to run simultaneously.

The converter and attached devices emulate an IBM 360 and 370 Hasp RJE workstation, KMW stated. A CRT/-keyboard or printer/keyboard can, with an RS-232C interface, serve as an operator's console.

According to the vendor, an input device such as a card reader, paper tape reader, digitizer or magnetic tape

unit appears to the host mainframe as a card reader. An output device such as a line printer, pen plotter or paper tape punch appears as either a line printer or card punch to the host.

Further, I/O devices such as graphics CRT terminals, printer keyboards and minicomputers appear to the host CPU as a line printer or card punch for outputs, but can be switched dynamically to appear as a card reader for input.

The BAC-Hasp runs as fast as 9,600 bit/sec at rates specified by the user's modem, KMW noted. Standard transmission blocks consist of 400 to 500 bytes.

The protocol converter costs $4,250, KMW said from 8307 Highway 71 West, Austin, Texas 78735.

TRT, WU Plan Service

According to a TRT spokesman, the big benefit will be in call set up time. With Eits, calls can be set up five to six seconds faster than with Telex/TWX, he explained.

Follow-On Offering

Eits is a follow-on to the "unbundled" international Telex tariffs established by U.S. international record carriers (IRC) late last year [CW, Nov. 20]. Under these tariffs, the user gets a choice: It can pay for the domestic circuit linking its terminal with an IRC switching center or get a "free" access line from the carrier.

If the customer provides its own access, it pays 55 cents/min less than it

would for using the IRC's international Telex circuit.

TRT and WU are providing access circuitry as part of Eits, but the carriers are also reducing international usage charges by 48- or 53 cent/min. The former reduction applies to messages transmitted directly from the customer's terminal to TRT's switching center; the latter applies to store-and-forward messages sent via Middletown.

In either case, the reduction roughly equals the net saving a volume international Telex user would obtain if it did business with a competing carrier and provided its own access circuit.

As TRT put it, "We believe that the [seven-cent and two-cent] per minute differential will approximate the alternative land-line transmission costs that a typical large volume hinterland user would incur in transmitting [its] traffic to the IRC gateway centers in order to take advantage of the customer-paid option discounts in the IRC tariffs."

Advantage of Eits

Some users however, will cut their international Telex costs considerably by using Eits instead of a competing "customer-paid access" service.

"If the user has a dedicated access line costing $350 to $400 per month," TRT tariff chief Richard Yalen said, "he must transmit 637 minutes of messages per month before a 55 cent/min rate reduction balances this expense.

"If [the user] subscribes to Eits, however, the cross-over point is much lower." The user "gets the access line as part of the service package and his only expense for the facility is a local access charge of $30 to $40 per month."

Since the usage charge for the user's international Telex circuit is reduced 48 cents or 53 cents per minute, approximately 80 minutes of usage each month will generate savings sufficient to balance the local access charge, Yalen said.

8A1/8B1 Private Nets Gain Message Station

ROCHESTER, N.Y. — Users of the 8A1/8B1 private-line protocol have gained a message station that reportedly extends the capabilities of the Comm-Stor II communications storage unit developed by Sykes Datatronics, Inc. and sold by AT&T.

Sykes has introduced the Comm-Stor 8A1/8B1 message station to provide 8A1/8B1 multipoint users with storage and backup features, according to a spokesman.

The station will make the Comm-Stor II storage unit and Sykes' Comm-Stor III Communicating Forms Entry Station compatible with existing 8A1/8B1 networks and equipment, the source added.

Typically, there are a number of terminals in an 8A1/8B1 network that must communicate with each other over long distances, the spokesman continued.

Able to store up to 3,000 messages of 128 characters each, the Comm-Stor 8A1/8B1 messsage station reportedly can support any asynchronous terminal or printer in this kind of multipoint arrangement.

Message Traffic

A line controller, usually a minicomputer or mainframe, handles the message traffic in the 8A1/8B1 environment, the Sykes spokesman noted.

The controller periodically polls each station for messages to be transmitted and delivers the messages to the terminals designated to receive them.

With the Comm-Stor 8A1/8B1 message station, the operator may prepare messages simultaneous with those being transmitted or received. There is no interruption of the terminal operator's work, the spokesman asserted.
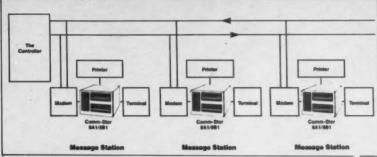
In an intracompany electronic mail system, this means more productivity at a workstation and increased effi-ciency of message dissemination, he added.
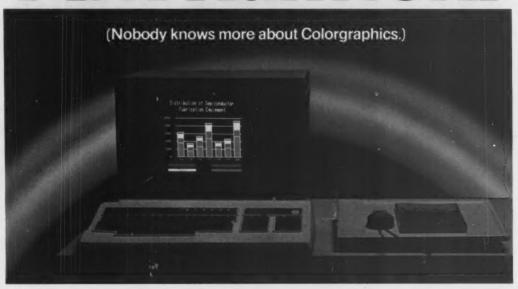
Variable length messages can reportedly be sent to one or more locations at a time, while the 3,000-message storage capacity allows the operator to prepare and store messages for future transmission.

The Comm-Stor II message station costs about $500, Sykes said from 375 Orchard St., Rochester, N.Y. 14606.

The Comm-Stor 8A1/8B1 Message Station supports multipoint private-line communications under the 8A1/8B1 protocol. The station can store up to 3,000 messages of 128 characters each and transmits as fast as 2,400 bit/sec.

Covers 13-State Territory

Insurance Net Eases Paperwork, Policy Writing

By Jay Woodruff
CW Staff

DALLAS — An insurance firm has radically reduced the effort needed to produce mortgage protection policies by automating policy preparation and establishing a network to reduce paperwork.

U.S. Life Title Insurance Co.'s automation effort began three years ago with a pilot test in San Antonio, Texas. It grew to include 11 main branches, mostly in the Southwest. Many more individual agent branches use terminals to interact with the main branch computers.

The computers are connected to U.S. Life headquarters here over dial-up lines for central recordkeeping and for generating yearly reports.

Paperwork Burden

Donna Comstock, U.S. Life's assistant vice-president for data operations, characterized the now-replaced manual system as virtually "impossible" to work with because of the heavy pressure that government places on the title insurance industry to account for its actions.

Complex documents took a considerable amount of time to complete — the company writes more than 13,000 policies a month — and the insurance company had to prepare a variety of special reports to satisfy the requirements of insurance commission offices in each state.
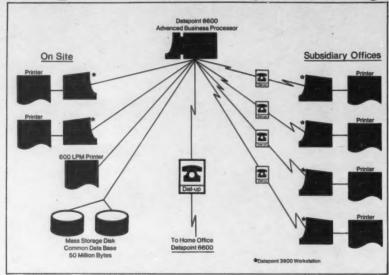
"We sell service," Comstock said. U.S. Life figured that the fastest way to provide that service was to establish some sort of computer network that would reduce the time it took to generate paperwork, one of the main products of the title insurance industry.

The network it now uses has allowed the firm to reduce the amount of manual effort needed to get title insurance documents and closing statements to property buyers on time and to move more quickly to perform last-minute changes and calculations, she said.

The insurance firm finally chose Datapoint Corp. systems largely because the computer company's Databus software package suited U.S. Life's forms processing needs, Comstock said.

A software company approached U.S. Life and was contracted to write Objects, which takes into account the reporting requirements of each state served by the insurance company.

U.S. Life uses Datapoint systems all the way through the network. Branches use the models 5500 and 6500 or combinations of those computer systems arranged as part of a Datapoint Advanced Resource Computer (ARC) distributed computer system. Each computer or series of computers is tied to a number of Datapoint 3600 CRT terminals and printers.

Each workstation not only communicates interactively, but can communicate with any workstation in the U.S. Life network through the Dallas-based headquarters, according to Comstock.

Branch Offices

Every CPU uses a 6010 processor as a front end, which handles the terminal communications. Sizes of branch office CPUs are dependent on the size of territory being covered, she added.

For example, Austin, Texas, uses a 5500 system with four in-house terminals, with dial-up lines to two remote branches. A dedicated hookup is connected to a terminal in Georgetown, Texas.

A larger installation in Albuquerque, N.M. uses a 6600 system with four in-house and five remote terminals. Houston installed an ARC system consisting of a 6600 processor and a pair of 620 processors. Of its 23 terminals, 14 are remotely located in the Houston area.

Two processors are located in Denver and Fort Collins, Colo. The latest processor was installed last week in Atlanta.

Other offices not connected remotely to a Datapoint system are having written for them a software program that will accomplish the same tasks on smaller Datapoint systems, like the 1500.

How is the automated system used? In a typical situation, a branch office takes a request for title insurance on a property that will be purchased in the near future. A title insurance application form, for example, may run to 15 pages of typewritten text.

From the 3600 workstation, the operator can call up standard multiuse text from the memory unit of the 5500 or 6600 processor and insert variable information within the text, depending on the nature of the property and the coverage sought.

When the entire document has been prepared and reviewed, the operator places it in the computer's memory, and the workstation printer can be ordered to print as many copies as needed.

Each night, the Dallas headquarters computer polls the 11 main branch installations and gathers statistical information based on that day's business. The income and reporting requirements of each state are handled by the Dallas system, which generates all the needed reports on the dates specified by the government agency requiring them, Comstock said.

"They literally bent over backward to put in the computers, well beyond the call of duty." In her recollection, she said, Datapoint is the only firm that has lowered the maintenance cost of a system since the time of its installation.

A typical U.S. Life branch network system is actually a network within a network because the Data-point 6600 processor is one of 11 similar systems connected to a central 6600 in Dallas.

Western Telematic Offers Self-Powered Multiplexer

SANTA ANA, Calif. — A self-powered terminal multiplexer from Western Telematic, Inc. allows up to four terminals to share a single printer, modem or CPU without unplugging cables.

So claimed the vendor in introducing its TM-41 multiplexer for terminals featuring the RS-232C interface. The following modes can be switch-selected with the device:

- An equal-priority lockout mode, allowing the user to activate one port at a time.
- A local mode, inducing an "OR" condition for all four of the multiplexer's input ports.
- A multiple mode, activating any of the ports at the same time.
- A speed-select mode, permitting each port to be programmed for auto-

matic speed switching on a Bell 212 modem.

An RS-232 Control Cable and Activity LED Module is optionally available with the TM-41 for mode selection at the terminal.

The multiplexer was termed suitable for such arrangements as four CRT terminals sharing one printer; a 1,200 bit/sec CRT terminal and a 300 bit/sec printer sharing a 212 modem; and multiple terminals sharing a CPU or remote storage device.

The basic TM-41 weighs 3 lb. and comes with a power cord and one modem cable, Western Telematic said. The terminal multiplexer costs $295, while RS-232C cables featuring select modules sell for $35 each.

Western Telematic is located at 2435 S. Anne St., Santa Ana, Calif. 92704.

Taiwan Can Access Tymnet

TAIPEI, Taiwan — Taiwanese data communications users can now access Tymnet, Inc.'s U.S. packet network.

A communications processor known as the Tymnet "Engine" was installed here recently by the Taiwanese International Telecommunications Administration. The Engine provides direct communications to the U.S. Tymnet

and GTE Telenet Communications Corp. data networks via the international facilities of ITT World Communications, Inc.

According to a spokesman, Taiwanese organizations and Taiwan-based subsidiaries of U.S. corporations can now communicate directly with U.S. computers tied to Tymnet by using standard acoustically coupled terminals or terminals linked to CCITT X.21 modems.

The general public in Taiwan may also use this service to access about 280 U.S. computer systems, the spokesman added. Those systems provide time-sharing services, on-line data base searching, numerical flight planning and other services available to Tymnet subscribers.

The Taiwan access to Tymnet is available for a connect charge of 480 NT (Taiwanese) dollars per hour, which is about $13.33 in U.S. money, the spokesman noted. In addition, the user is charged volume fees of 24 NT dollars (about 67 cents U.S.) per 1,000 characters of transmission and a minimum monthly charge of 2,400 NT dollars (about $66.67 U.S.).

There is a minimum billing of three minutes per call. Tymnet, Inc. is headquartered at 20665 Valley Green Drive, Cupertino, Calif. 95014.

Adapter Unveiled For IBM Series/1 Handles 16 Units

TROY, Mich. — Up to 16 IBM Series/1 users can communicate at speeds up to 277K char./sec with System Associates, Inc.'s SAI-400 long-line adapter.

Hookup is accomplished through the use of an RG62 a/u single-wire coaxial cable. The computers involved in the connection should all be within a mile of each other, the vendor said.

The SAI-400 can also be used as a plug-compatible unit between Digital Equipment Corp. PDP-11 minicomputer systems. Suggested applications for the unit include plant networks, data acquisition, front-end systems and computer-aided design and computer-aided manufacturing.

The long-line adapter offers an address register and "word count characteristic" said to give the SAI-400 its own direct memory access transfer.
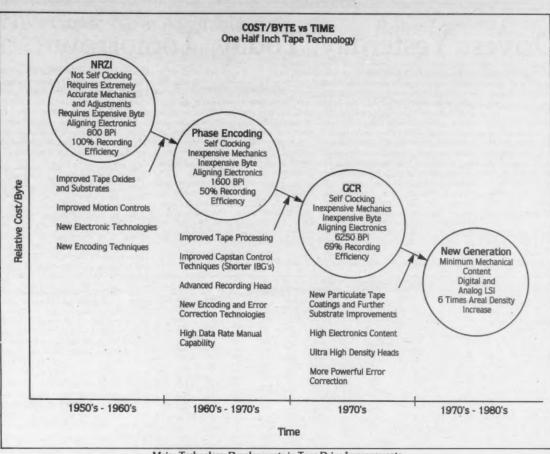
The SAI-400 costs $4,950, the manufacturer said from 55 Park St., Troy, Mich. 48084.

Modem Speed Runs Up to 450 Bit/Sec

LIVERMORE, Calif. — A $185 originate-only modem from Modtech, Inc. is compatible with Bell's 103 and 113 data sets and plugs directly into the telephone network via conventional jacks.

For any terminal with RS-232C or 20mA interfaces, the M103 modem runs as fast as 450 bit/sec in full-duplex mode.

Modtech is located at 1958 Helsinki Way, Livermore, Calif. 94550.

CRT Monitor Targets OEMs

TULSA, Okla. — A high-resolution 15-in. CRT monitor aimed at the OEM market has been announced by Telex Computer Products, Inc.

The HR-1500 raster scan monitor is capable of displaying more than 1,920 characters in either white or green phosphor. It provides 400 active raster lines with a high horizontal scan rate of 25kHz, a refresh rate of 50 Hz to 60 Hz, vertical step scan and dual intensity display, the manufacturer said.

The HR-1500 is priced at $260 in large quantities, while a terminal package with monitor, cabinet, power supply and detachable keyboard costs $550, the vendor's OEM division said from 6422 East 41 St., Tulsa, Okla. 74135.

SYSTEMS & PERIPHERALS

COST/BYTE vs TIME
One Half Inch Tape Technology

Relative Cost/Byte

NRZI
Not Self Clocking
Requires Extremely
Accurate Mechanics
and Adjustments
Requires Expensive Byte
Aligning Electronics
800 BPi
100% Recording
Efficiency

Improved Tape Oxides
and Substrates

Improved Motion Controls

New Electronic Technologies

New Encoding Techniques

Phase Encoding
Self Clocking
Inexpensive Mechanics
Inexpensive Byte
Aligning Electronics
1600 BPi
50% Recording
Efficiency

Improved Tape Processing

Improved Capstan Control
Techniques (Shorter IBG's)

Advanced Recording Head

New Encoding and Error
Correction Technologies

High Data Rate Manual
Capability

GCR
Self Clocking
Inexpensive Mechanics
Inexpensive Byte
Aligning Electronics
6250 BPI
69% Recording
Efficiency

New Particulate Tape
Coatings and Further
Substrate Improvements

High Electronics Content

Ultra High Density Heads

More Powerful Error
Correction

New Generation
Minimum Mechanical
Content
Digital and
Analog LSI
6 Times Areal Density
Increase

| 1950's - 1960's | 1960's - 1970's | 1970's | 1970's - 1980's |

Time

Major Technology Developments in Tape Drive Improvements

Tape: Yesterday, Today, Tomorrow

By Ron Brown
Special to CW

When Denmark's Valdemar Poulsen first applied for a patent on his "Telegraphone" voice recorder in 1898, little did he know that from his invention would spring a technological revolution that has been sweeping the world since the mid-1900s. Described initially as a magnetic recording machine, Poulsen's device is generally considered the forerunner of today's tape drives and recorders.

Technically speaking, the Telegraphone was quite advanced for turn-of-the-century engineering. It utilized a steel wire, .01 in. in diameter, that was drawn past magnetic cores surrounded by coils through which sound currents were passed. The wire was then drawn through similar magnetic cores and voltages were generated matching the original currents.

The device was far from perfect, however. It had three major limitations — noise was extremely high, frequency response was limited and the recording range maximum was about 20 db.

Poulsen first exhibited his device at the 1900 Paris Exposition, sparking a great deal of publicity and discussion on its uniqueness and future. Despite its limitations, most attendees were enthralled with the Telegraphone and believed its problems would soon be solved. Poulsen eventually sold the rights for manufacturing and distribution of his recorder, but apparently no Telegraphones were ever built.

The next major development in the field of magnetic recording occured in Germany in the 1920s with the formation of a company called Telegraphic-Patent-Syndikat. The company's founder, Kurt Stille, sold licenses to anyone interested in manufacturing magnetic recording equipment, of which he held the patent. Although the exact origins of his machine are not known, many believe it to be a slightly modified version of Poulsen's Telegraphone.

The Blattnerphone

A motion picture promoter by the name of Blattner purchased the entertainment rights to Stille's machine in 1930, modifying it slightly and renaming it the Blattnerphone. Using steel tape .003 in. thick and .25 in. wide, the Blattnerphone had slightly better frequency response than Poulsen's machine, but still had high noise levels and was expensive.

Although the Blattnerphone is believed to be the first magnetic recorder ever used in the Western Hemisphere for commercial purposes — the Canadian Broadcasting Corp. utilized it for delayed broadcasts — it was eventually discarded for economic and technical reasons.

Another license for manufacturing of dictation and telephone recording equipment was sold to Karl Bauer and the Echophone Co. in the early 1930s. That equipment, named the Dailygraph, was the first recorder to use a tape magazine instead of separate reels.

The machine gained wide acceptance during the 1930s; it was apparently attractive because of its simplified operation. From that point on, commercial use of magnetic recorders expanded as the technology developed and improvements were made.

Efforts in the 1950s

This technology was the basis for efforts that began in the 1950s on the use of magnetic tape for computer data storage. Scientists first considered the possibilities in late 1954 while searching for greater storage capacity, more flexible memories and off-line storage capabilities.

By mid-1955, engineers at Ampex Corp. were developing a digital tape transport for magnetic tape that would be used as an off-line storage device for digital data processing systems. The engineers believed many storage problems would be solved with tape's fast access time and greater flexibility when compared with the punched cards generally in use at that time for data storage.

One of the critical problems faced by engineers trying to modify the recording techniques for computer use was the rapid start/stop time required when searching a reel of tape. Within eight months of first tackling this problem, Ampex engineers had it solved and displayed the FR-200 at the Eastern Joint Computer Conference in 1955 and again at the Western Joint Computer Conference in San Francisco in 1956.

The device was such a success that Ampex sold its complete production run within one month to such computer giants as IBM, Remington Rand, NCR Corp. and MIT.

Compared with today's tape drives, the FR-200 was very limited. It had a simplified servo system that controlled feeding of the tape and could start and stop in .005 sec. Threading was accomplished quite easily, allowing for fast reel changes and saving a great deal of time.

Ampex's success with the FR-200 prompted the company to continue developing tape transports, and within eight years the company had introduced four models, each more sophisticated than the last. By late 1963, Ampex was marketing the TM-7, a single-capstan tape drive designed to use 80% fewer parts than former models and completely eliminating the traditional pinch rollers, brake cylinders and follower arms. Ampex heralded the TM-7 as needing little

Tape Drives: Yesterday, Today, Tomorrow

maintenance and being easier to operate, lower in cost and more reliable.

Other Developments

While Ampex was making modifications to its tape drives, other manufacturers were working on unit concepts in limited areas. One such development was the invention of the vacuum column buffer for tape control in the mid-1950s. This allowed buffering to be placed between the low-inertia, high-acceleration capstan and the high-inertia, low-acceleration tape reel and reel motor.

The oxide-coated tape in use at that time was then buffered by the vacuum and the oxide side touched the column walls, capstan, read/write head and the tape cleaner. In the late 1960s, considerable improvements were made in the tape drive to allow the oxide side of the tape to touch only the read/write head and the tape cleaner, minimizing the debris generated from the oxide coating rubbing against the column walls.

Another major development in tape drive technology was the inclusion of the automatic hub engagement and disengagement in 1970. Because of the force needed to hold a reel on the hub without slippage, this improvement became virtually mandatory in the newer, high-speed machines that required greater torque (equal to approximately 30 pounds) than a human being could be expected to provide. As a matter of course, this technology was included in the lower speed drives as well.

Performance Advances

As improvements were being made in the tape drive itself, so were advances in tape performance. These were primarily in the area of physical, chemical and mechanical properties since the upward/downward capabilities imposed on the tape prohibited changes in the area of magnetics.

The properties' improvements allowed for corresponding decreases in tape costs. With higher densities and overall lower prices, the cost per bit stored has dropped from 10^{-3} dollars per bit to 10^{-10}, and the volume needed to store a bit decreased from .3 times 10^{-3} in.^{3} per bit to 10^7 in.^{3} per bit.

A time-line of tape and tape drive improvements since the 1950s shown on Page 49, illustrates the major technological developments along with changes in the field. Since tape subsystems of the 1950s and the 1960s did not have self-clocking codes, they required very accurate mechanics and adjustments and expensive byte-aligning electronics with 100% efficiency.

Improvements in tape oxides and substrates, motion controls, electronic technologies and encoding techniques helped to correct the major disadvantages of early units, but the recording efficiency dropped to 50%. Not until group-coded recording (GCR) techniques were developed in the mid-1970s were manufacturers able to market subsystems at 69% efficiency while still retaining the advantages of earlier models.

The nonreturn-to-zero (NRZ) conventions of data recording in nine tracks with changes in the direction of magnetism have been combined with phase-encoded (PE) detection circuits and deskewing scheme for a maximum flux-change density of 9,042 fc/in. and a density of 6,250 bit/in. The recording efficiency is then .69, which is 38% better than PE alone.

The new generation of drives expected during the 1980s should further enhance efficiency while continuing to improve other aspects of transports and tape.

Interchangeable Peripherals

During the early subsystems development phase, manufacturers were also coming to the realization that it would be advantageous to have components that were compatible with the mainframes beginning to dominate the marketplace. As the need for interchangeability increased, the need for industrywide standards also grew, prompting the establishment of an industry standards society called the American National Standards Institute (Ansi).

Since its founding, Ansi has published electronics standards for computer peripherals and mainframes throughout the world as new technologies are developed and established.

With the publication of industry standards came the beginnings of "plug-compatible" peripherals — components that were manufactured by one company expressly for use with another firm's mainframe. It is generally believed that the first plug-compatible tape drive was a Potter Instrument Co. model developed in the late 1960s that was the equivalent of the IBM 729.

State of the Art

Today's typical state-of-the-art large system tape drive moves tape at the rate of 200 in./sec and can provide an access time as low as .95 msec. Depending on the recording method used, the data rate can be as high as 1.25M byte/sec (as with GCR).

These drives generally offer low mass, small volume and low cost per unit of storage capacity. High capacity per reel, high reliability and media interchange, coupled with the market-induced backward compatibility, has produced contemporary tape drives that boast the best of all technologies since the introduction of the FR-200.

NBS Guide Now Available On Data Entry Equipment

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A guide to selecting data entry equipment, prepared by the National Bureau of Standards, is now available to the public through the Government Printing Office.

"The cost of data entry represents from 30% to 40% of the total DP budget in typical installations," according to the report, which states that the number and variety of products and vendors in this field present numerous opportunities "for use of more efficient and economical advanced data entry systems."

While written to help federal DP managers take advantage of those opportunities, the report has practical application for any DP shop contemplating data entry equipment acquisition. Following an introductory discussion of the various factors to be considered in selecting this type of equipment, the report moves on to three chapters of descriptions, applications and costs of various data entry hardware.

Selection Criteria

The introduction briefly touches on three "primary" factors in selecting equipment: transaction volume, point of data origin and transaction class, as well as "secondary" factors of accuracy and administrative controls and additional factors such as media compatibility and communications considerations.

A subsection entitled "General Considerations" outlines performance, physical specifications, input, output, error checks and future growth potential considerations.

And after discussing the economics of equipment selection, the report lays out "Basic Steps" in the selection process, from state-of-the-art familiarization and requirements analysis through solicitations, contract award and acceptance testing.

While this introductory section on the various factors involved in equipment selection is somewhat cursory, the remainder of the study is devoted to a lengthy discussion of three methods of data entry.

This second section is broken down into three chapters — "Basic Keyboard Input Devices," "Reader-Type Devices" and "Special Input Devices." Different data entry methods are profiled, with subchapters based on equipment categories — key-to-disk, optical character readers and voice recognition systems, for example.

Fundamental Information

"It should be stressed," the publication notes, "that this report is not intended to provide comprehensive specifications for every data entry device (or system), but rather to introduce the types of data entry equipment that are available."

"Selection of Data Entry Equipment" is available for $3.50 from the Government Printing Office, Washington, D.C. 20402. Its stock number is 003-003-02133-4.

Survey Rates Itel CPUs Highest

DELRAN, N.J. — If you are looking for a plug-compatible mainframe, you might want to consider equipment from Itel Corp. (now from National Advanced Systems), which users rated above that of Amdahl Corp., Control Data Corp. and IBM in "overall satisfaction," according to a recent Datapro Research Corp. survey.

While there is some uncertainty whether National Advanced Systems Corp. will live up to the reputation of the Itel Corp., whose mainframe operation it absorbed, present users rated Itel equipment higher than the other three in ease of operation, reliability of mainframe, technical support, applications programs, ease of programming and ease of conversion.

Designed to help users put this new market in perspective, "All About Plug-Compatible Mainframes" compares the characteristics of 22 mainframes from the seven vendors.

Reprinted from the January supplement to *Datapro 70*, the report describes the growth of the industry and compares the models in 12 pages of charts. It costs $15 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Digital introduces
DEC Datasystem 540.

Tape Drives: Yesterday, Today, Tomorrow

One of the major limitations in tape drive technology until recently was the unattainability of critical machine tolerances in the manufacture of components. Based on new technologies now being utilized, a full tape drive casting can be machined on a single pass with a tight hold on the needed tolerance. The result: higher tolerance at lower costs with better reliability.

Storage Technology's Corp.'s (STC) Model 3670 is the company's state-of-the-art GCR tape drive, utilizing all the advances listed above. Additionally, the unit's capstan accelerates tape to full speed in just under 1 msec, requiring in excess of 700 gs.

This type of performance is accomplished by using a low inertia servo motor and capstan and by minimizing the length of tape being accelerated through the use of auxiliary tapered vacuum columns between the main straight vacuum columns and the capstan.

In technology, both the servo and capstan motors are well advanced: Each has a very high torque-to-inertia ratio, which was created specifically to fill the industry's need for faster access times with tape drives. The motors also played a significant role in the development of tape velocity control, allowing the elimination of any elapsed time between the start of the capstan and the movement of the tape, thereby reducing the amount of acceleration necessary to get the tape to move.

The faster access time created some other problems, however. Because the acceleration forces on the tape in the backward direction reduced the tension on the tape to nearly zero, there was a need for further improvement in the design of head contours. The acceleration also dictated the need to apply a vacuum to the capstan in order to increase the frictional driving forces between the capstan and the tape.

The elimination of these problems, coupled with the performance advances of the 3670, has allowed STC to supply its tape drive users with faster disk-to-tape dumps at the rate of 1,250K byte/sec, closely matching that of today's high-density disks with a rate of 1,198K byte/sec.

Tape technologies are advancing as rapidly today as in the past two decades. While much has been said concerning the "dying tape subsystem industry," STC believes the medium will continue to be highly sought after and widely used, particularly for interchange, journaling, archival and back up functions.

Tape will also continue to have virtually no competition as the highest density, lowest cost form of storage available, and emerging technologies will serve to enhance this advantage. The continued success of nonremovable rigid disk subsystems will see the demand for high-performance tape grow, not diminish, especially as backup and recovery media.

The upward/downward capabilities imposed on today's tape storage systems also place limitations on the improvements that can be made to these units. Without the ability to make major changes in the magnetic properties, manufacturers are left with only two ways to improve the performance of magnetic tape storage systems — speed up the tape and pack it more densely.

Electromechanical limitations are prohibiting the advance of tape speeds beyond 250 in./sec, but bit density and transfer rates have been increased with the careful selection of recording and error-detection and correction methods.

The Power Problem

These developments have not solved the other major limitation in high-speed minicomputer tape application: power requirements. Tape transport power requirements go up exponentially with speed — forcing changes in the capstan and reel control systems, pneumatics, power amplifiers and the vacuum columns. The increased cost of redesign for a speed such as 200 in./sec in the smaller units so far is not justifiable.

While many improvements have been made in the mechanics of tape subsystem operations, an emerging technology aims to eliminate the need for much of the electromechanical content, thereby reducing maintenance costs and improving subsystem performance at the same time.

STC believes the most popular future tape drives will utilize a "data-streaming" technique whereby a tape, once it reaches operating speed, will remain at that speed and not start and stop between data blocks as is typical today. With streaming, data is buffered until needed by the CPU.

Other advances that are expected to improve subsystems revolve around increasing areal densities on tape. The latest tape units, recording at 6,250 bit/in., combine the best aspects of the two major recording methods, NRZ and PE, to give GCR the highest density now available.

To increase this density any further, manufacturers must continue to improve tape substrates, coating processes and magnetic performance. A smoother tape coating will be necessary for higher densities.

Contrary to much recent discussion, it is obvious that technology will not only continue to be highly sought after, but significant improvements will allow more efficient use of these valuable subsystems.

Brown is manager of business planning for the Tape Division of Storage Technology Corp. in Louisville, Colo.

Considering CAD/CAM

Organizations contemplating computer-aided design and computer-aided manufacturing systems face a shortage of technological expertise and a dearth of reliable information. A new guide explains the rules, techniques, procedures and formulas to investigate, select, justify and install cost-effective CAD/CAM systems.

By S.H. Chasen And J.W. Dow

Evaluating the potential of computer-aided design (CAD) and computer-aided manufacturing (CAM) is a frustration for many organizations. The general potential is so great that the technology is exceedingly short on expertise that can treat the particular needs and answer the particular questions an organization might have.

There is more work than can be addressed in special fields embraced by CAD/CAM such as interactive computer graphics, electronics, display technology, software techniques, analysis and geometric modeling, systems integration and much more. The experts in these specialty areas are so highly utilized that they have little or no time to address the entire spectrum of CAD/CAM-oriented problems or to be concerned with problems outside their immediate sphere of operation. In addition, because of the shortage of expertise and the high demand for it, there are many opportunists who enter the field with inadequate qualifications. This makes it difficult for the uninitiated to ascertain where to find reliable and quality in-

This article was excerpted from The Guide for the Evaluation and Implementation of CAD/CAM Systems, by S.H. Chasen and J.W. Dow. The 350-page guide is available for $215 from CAD/CAM Decisions, P.O. Box 76042, Atlanta, Ga. 30328.

formation to get started. There are several rules of thumb that should help both the investigative process and the continuing involvement in CAD/CAM (see list alongside).

The process of studying the feasibility of CAD/CAM for a particular organization and the process of CAD/CAM implementation raises many questions:

1) What is the scope of our problem?
2) Does our application(s) stand alone or must it interface with an existing automated application complex?
3) How do we interface to existing and varied levels of automation?
4) What kind of risk/reward relationships characterize our applications?
5) How much and what kind of in-house expertise must we develop?
6) How well will existing computing facilities adapt to our needs?
7) How do we serve centralized or decentralized users?
8) What kind of packaged, turnkey or other type of computer graphics and CAD/CAM system relates to our problem?
9) How much software exists for our applications and how much must we develop?
10) How will a system facilitate the change from English to metric or metric to English units?
11) How can we expand present or conjectured CAD/CAM systems to meet future needs?

Related Considerations

Questions such as these are very dependent upon the organizational structure, organizational policies, type

of existing expertise, level and complexity of present automation, type and mix of applications and so forth.

Generally, these considerations have to be carefully studied with respect to CAD/CAM by those who are familiar with or who become familiar with the organization's operation. This must be coupled with a broad knowledge of the characteristics, attributes, potentials and limitations of CAD/CAM technology.

(Specific system characteristics such as whether the display should be "refreshed," storage, raster graphics or various combinations of these properties are typical *detailed* considerations. The guide provides the methodology for their evaluation, but does not delve into the virtues and limitations of specific hardware and software alternatives except through vendor responses to a request for proposals [RFP]. Appendix E, elsewhere in the guide, which includes specification development, will bring out both the relevant questions and vendor responses in a natural course of events. Vendor responses to an RFP will articulate the relative merits of various system alternatives [hardware and software] as they relate to user applications. The validity of these responses will be assessed using appropriate benchmark activities described within the guide.)

The state of the art is inadequate to develop detailed definitive answers that contain no risk factors. Therefore, it is necessary to weave a comprehensive rationale and logic — a rationale and logic that balance the many factors and parameters and put them into

If You Need More Help. . .

1) Use qualified consultants and/or references at all levels of investigation. Their cost is minimal compared with the costs of misdirection.

2) Seek advice from vendors and attend their seminars. Discount much of their promises about future projects and products.

3) Talk to as many users as possible, preferably referred by other than vendors. Users may do well describing the pros and cons of their systems, but without considerable experience, they may be very poor at making systems comparisons.

4) Attend conferences, seminars and short courses. Study offerings carefully to see if they contribute to corporate objectives which change and mature with time. Do not assume that because a conference course has the right title, it truly relates to your needs.

5) Subscribe to publications that tell what's going on in the field, what documents are useful, what people are doing, what equipment is being purchased, what new hardware and software are available and what events are coming.

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IN DEPTH

(Continued from In Depth/1)
proper perspective. The basic objective is to analyze existing and potential applications and to determine the cost-effectiveness of CAD/CAM implementation.

The foregoing questions outline an investigation process which can result in the implementation of a cost-effective CAD/CAM system. Basically, such an investigation should be composed of five distinct phases:

• A preliminary system planning effort is undertaken which demonstrates a risk/reward relationship sufficient to warrant management's approval to continue the investigation. This planning step relies heavily upon seasoned application experience in the line organizations of the corporate structure.

Demonstration of conceptual cost and functional feasibility is required at this point. (If the risk/reward relationship demonstrated here is not sufficient to obtain management's endorsement of the effort and instructions to continue the effort, then the expenditure of resources will have been minimized and the investigative effort is terminated at this point.)

• A detailed system evaluation and analysis continues the investigation to expand and refine the data organized during the preliminary system planning effort. At this point, the application set must be considered in detail to develop a set of functional specifications sufficient to establish a request for proposal from some select group of prospective vendors of CAD/CAM systems. It is important to note that the request for proposal should be just that and no more.

A composite evaluation technique will be employed to encompass the subordinate evaluations of the vendor proposals, the benchmark tests, the installation schedule and the detailed cost-benefit analysis. Evaluation of the vendor proposals will result in top-ranked vendors being given an opportunity to participate in benchmark activities.
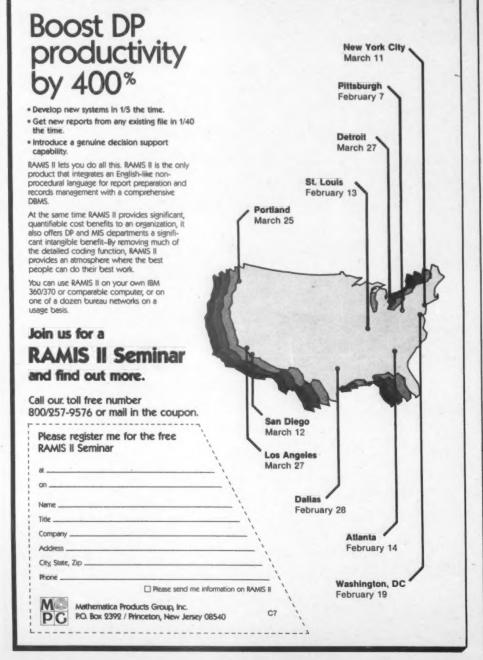
A recommended system configuration which prescribes the required hardware and software characteristics will be benchmarked and evaluated for each of the remaining, contending vendors. System delivery schedules from contending vendors will be evaluated at this point. From recommended system configuration definitions, a firm cost figure can be derived for various practical system sizes. Then detailed cost benefit considerations, predicated upon definitive applications data, can be evaluated.

Completion of the composite evaluation activity encompasses all facets of the system evaluation steps and results in the identification of the "best" system configuration and vendor. Final conclusions and recommendations can now be formulated for management action. At this point, management either commits or terminates further expenditures of funds and resources toward the implementation of a CAD/CAM system.

• Management's approval of and commitment to the implementation of a CAD/CAM system results in the procurement of such a system.

• System installation efforts include the development of inter- and intradepartmental coordination and control procedures in preparation for system implementation. Site preparation and preliminary console user and system operator training activities should be accomplished prior to system arrival and installation. When the system hardware and software facilities arrive, concurrent activities such as installation, system testing, more intense user training and application conversion
(Continued on In Depth/8)

IN DEPTH

(Continued from In Depth/6)
begin. System installation and testing result in final system acceptance. User training and application conversion continue into a mature operations capability.

• With a mature CAD/CAM system, production system support enhances cost-effective operation. The same analysis steps can now be used to provide a well-defined measure of actual cost-effectiveness. Then the familiar, tested methods can be used with confidence to evaluate the potential of new applications as candidates for CAD/CAM implementation. Changing corporate posture and real-world environments can be factored into the CAD/CAM operation procedures to allow management to maximize the benefits or return on corporate investments.

In the following section, we will elaborate on more specific areas of justification. Naturally, we all prefer to establish justification via direct cost benefits through the increased productivity that is characteristic of so many specific applications. However, such benefits, in themselves, may be insufficient for some organizations to justify acquisition of CAD/CAM systems.

Other benefits will be presented first, saving the treatment of direct cost benefits as the last portion of this discussion. These so-called indirect or subjective benefits may very well represent a far greater total value than the more direct benefits that can be more readily quantified.

Justification and Benefits

1. Product Quality. The quality of a product may be classified in two categories: functional and physical characteristics. In the construction of a bridge, for example, the functional concerns might be its ability to withstand various conjectured loadings, its vibration characteristics, its response to climatic effects and its durability.

Through the use of CAD, it is possible to investigate more construction alternatives and more carefully evaluate special cases that might cause problems. Potential dangers through the actions and interactions of forces can be more thoroughly investigated, thereby

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giving a higher confidence level or margin of safety.

How can one put an economic value on improved safety? The collapse of a bridge or the loss of an aircraft engine assembly in flight are, fortunately, rare events; but the tangible cost of such an event is enormous and the intangible costs are extensive and immeasurable. How does this concept factor into the benefits analysis? Concern for society and the public relations value of advertising the fact that CAD/CAM sys-

tems improve reliability and safety may contribute to CAD/CAM justification.
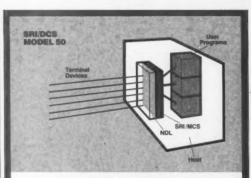
The physical attributes of a bridge construction would more likely pertain to small component parts from which the bridge assembly is constructed. Parts are manufactured to meet specified tolerances. Dimensions, holes, fillets, bosses and so forth are subjected to quality control. Some degree of automatic inspection may be employed, but in many areas considerable manual
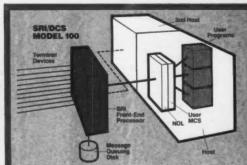
inspection is employed to assure adequate quality.

Statistically, there are formulas to indicate how much inspection is required to assure "acceptability" with given levels of confidence. As one would expect, the amount of inspection required increases more than linearly with the probability of defects. Conversely, the lessening of the defect probability, which is the normal experience with CAD/CAM systems, would result in significant reductions

in inspection with attendant cost savings.

Furthermore, the number of parts that must be fabricated to ensure an acceptable lot size would be significantly reduced. This cost saving could well be somewhat greater than that for reduced inspection, per se. If, for example, the standard cost for a job lot were $100,000, a savings of 10% of the number of parts that must be manufactured would result in a $10,000 saving. On this basis alone, a shop that

does a manufacturing business of $2.5 million annually could justify a CAD/CAM system. For very modest businesses, perhaps $1 million annually or less, composite CAD/CAM benefits may well justify a minimal investment in the field.

2. Shorter Project Span Times. It is readily apparent to any business that time is money when everything else is equal. This can be manifested in ways such as lower inventory costs, lower interest payments on borrowed funds

for a project, more efficient use of manpower with respect to scheduling, the reduction of unnecessary data processing and lower computer run costs. A shorter time requirement for a project might well be the basis for winning a contract which, in turn, could represent millions of dollars of business and more job security for the labor force.

In many special one-time applications, the total span time of a project and indeed the solution technique may be the critical considerations. There is

considerable inherent potential for CAD/CAM applications with these kinds of characteristics. Naturally, many specific needs or problems cannot be anticipated in advance. When the need is recognized, it is too late to acquire the required technology. Thus, the ability to respond to special problems is a justification that has obvious value but is difficult to quantify.

The saving of time has value and sometimes its value is substantial, but it does vary considerably with the situation. Management should apply some kind of justification factor to time-saving capabilities to augment other justification factors.

3. Integrated Data Base. The whole field of automation is evolving rapidly and CAD/CAM represents a distinguished facet of higher levels of automation. In this type of environment, a great deal of descriptive data remains within computer memory for access, update, change and so forth. Typically, the drawings of engineering firms, facilities mapping by utilities, transportation planning and environmental studies require a great deal of data manipulation. Once the data for an application has been input to the CAD/CAM system, it can be selectively retrieved by attributes, by drawing sections, by "windows" on a complete drawing, by overlays or layers (each of which contain certain classes of information) and by a host of other options.

The ability to automatically transform drawings or portions of drawings in many ways has far-reaching implications. In circuit design, a minute area, for example, can be enlarged easily for better visualization, for annotation or for alteration. Background information that may be necessary in a composite drawing may not be necessary for the development of certain subsystems such as electrical switching and heating and ventilation ducts. When working with such a subsystem, the user may extract from the data base exactly the background data that is relevant — no more, no less.
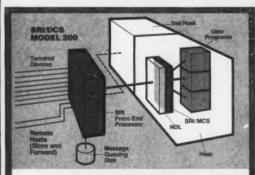
Modern CAD/CAM systems have the methods to perform many desirable functions automatically upon simple user request. Drawing editing is probably one of the most common functions of CAD/CAM systems. Perhaps, in order of magnitude, more often a drawing is changed than created; so the value of a CAD/CAM system is extended far beyond the increased pro-

IN DEPTH

ficiency of drawing origination. It is not uncommon for the fundamental drawing product to have little or no benefit in itself, but the use of the computerized descriptive data for that drawing in downstream activity is manifold. Just the ability to automatically produce plots of desired entities is, itself, of considerable value by the virtual elimination of tedious manual data reduction.

When data is effectively stored in memory, the output from one program can be tailored to be compatible with input to other programs. This is done in such a way that several programs may merge (or appear to merge) so that the user has, in effect, the equivalent of a single large program.

Both intradisciplinary and interdisciplinary functions benefit from this improved integration. Users in different disciplines develop a much clearer understanding of how their functions relate to other functions. Thus, for example, the design engineer knows of or can interrogate the computer about the permissible radii that manufacturing machines can readily accept. Through CAD/CAM and the improved communications link between engineering and manufacturing, it is less frequent that the engineer designs something that can not be manufactured.

A similar situation exists between engineering and construction organizations. The better interfacing of programs under control at a graphics console or workstation greatly reduces the repeated manual handling of both output and input data. So often in nonintegrated systems, the same data is output and input many times to satisfy programs which appear to be distinct but which may have many properties that lend them to efficient interfacing and integration.

Early Evaluation

When developing organizational plans for extended capability in automation, it is very important to assess the roles or potential roles of CAD and CAM as early as practicable. Such systems with graphics are more demanding on time-sharing techniques than systems without graphics. The human factors, which are vital to effective interactive computer graphics, impose certain requirements on the way priorities for time are allocated by the operating system.

Some of these requirements are sufficiently complex as to cause considerable difficulty should the requirements not be adequately taken into account in the system development stage. Whereas considerations of this kind are not contributions to justification, per se, they are necessary to accommodate the highest degree of integration.

4. The Only Approach. It is probably an overstatement to say that there are many problems that can only be solved by CAD/CAM technology. However, as a practical matter, the statement is essentially true. CAD/CAM readily lends itself to improved techniques. The mere changing of scale in local regions permits us to design tiny components and systems that would be too small to see if it were necessary to design them at the same scale used for the master drawing.

Working on a CRT, the development of a cutter path for numerical control part definition can be more closely optimized. It is easy, for this application, to display portions of the path at the discretion of the console user. Thus, considerable clutter can be suppressed, aiding in the visualization of the process. The opportunity to more closely optimize the cutter path is important because numerically controlled milling machines are expensive to operate. Saving time on them represents a monetary benefit of substance.

In the design of mechanisms, it is essential to establish the existence and the extent of clearances. The facility to

do this is aided immeasurably through the ability to rotate depicted objects to view a mechanism's positions at any time in its cycle and from any vantage point. In addition, in the applications involving the layout of piping, ducts, wire bundles and the like, it is most desirable to be able to reveal potential interferences. For example, someone may look down a conjectured linear run of pipe as viewed on end. Any potential intersection with existing networks would be apparent.

The important point is that systems that are three dimensional in nature cannot be studied efficiently from the creation of conventional two-dimensional drawings. There is no easy way to visualize clearances in that mode. Present-day CAD/CAM capability provides great flexibility of analysis and increases the understanding of 3-D systems by virtue of its transformation facilities of scaling, rotation, projection and so forth.

Added Benefit

In the sense of this discussion, users of CAD/CAM systems can not only perform their jobs more efficiently, but also can derive somewhat greater job knowledge. This expanded purview, in turn, has many benefits to the using organization.

Certainly, improved awareness and knowledge of the nature of applications and interactions of applications offer some hope in coming to grips with the expanding technical complexity that was discussed earlier. Many people feel that our society has become overspecialized to an alarming extent — to an extent that makes the necessary and vital systems approach to problem solution almost a thing of the past, even though that is not what is intended. It is recognized that the system approach is desirable and should be used in many projects. However, the expertise needed to handle the broader aspects of a project is frequently nonexistent — put out of business by overspecialization.

The freedom of the human mind to concentrate on the more esential parameters of a project, as afforded by CAD/CAM, offers a major potential for increased productivity and increased solutions to complex problems that has not yet been tapped to any significant degree. This concept will undoubtedly be of far greater value than any of the other benefits that will accrue from CAD/CAM systems. However, its value to an organization is most abstract and is, therefore, most difficult to quantify.

To factor in considerations of this kind to CAD/CAM justification is a challenge that only the most enlightened and most bold of management will accept. In any case, it should be apparent to the managers that they should, at the very minimum, monitor the effects of the increased learning.

5. 3-D Design Enhancement. The design and computerized definition of 3-D objets and surfaces are somewhat more complex than problems in two dimensions. As one might expect, there are many industrywide sug-

gested approaches to the treatment of the 3-D problems. Most of the prescribed techniques are still very much in a research mode with considerable academic influence.

The objective is to create designs and computer definitions in an interactive computer system that will be easy to operate by many individuals. The model definition should be created in as automated a fashion as practicable.

The definition [computerized model] is necessary for the many design and analysis tasks that relate to the object and to the system integration objective. A subtle fact is that the value of the definition technique depends on its ease of use in an inter-active system. If great effort is required to define an object and its features, then the typical disadvantages of interactive CAD/-CAM systems are compromised.

To date, there have been some well-articulated techniques by researchers to define large classes of 3-D objects. However, the usefulness of the tech-

niques is greatly limited by the cumbersomeness involved in using them, the heavy amount of computation, the noninteractive nature of the computation and the fact that many types of objects cannot be defined by the systems to meet manufacturing tolerances. The need for better 3-D definition techniques does not make the technical problem of achievement any easier; so there is still a requirement for well human-engineered interactive

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IN DEPTH

(Continued from In Depth/11) procedures to design 3-D objects.

It is only fair to point out that a concept of this importance will stir considerable controversy as to what directions and what types of procedures offer the greatest potential. What may be an acceptable approach or even a preferred approach by one person will be rejected by another. Thus, because of the complexity of defining 3-D objects on 2-D CRTs, a consensus on preferred approaches is not at hand.

This discussion is intended to arouse due caution. However, the general objective of this chapter is to formulate justification, and there have been notable successes in some applications in developing 3-D objects on CRTs.

Such successes come about for applications in which it is practical for the designer to create more-or-less conventional 2-D curves or contours in each of three orthogonal coordinate planes. The computer program will then automatically institute the programmed rules, relationships, algorithms and so forth (including interpolation and/or extrapolation techniques) to compose the surface definition of an object of interest. This concept is most effective for relatively simple surface shapes such as components of automobiles, airplanes, ships and construction panels.

Surface Definition

Similar to the desirability of being able to use different types of coordinate systems such as rectangular and polar, it is desirable to use different surface definition techniques even in the same problem; for example, the computer graphics development of an airplane surface is done much more efficiently if one technique is used for the fuselage and nacelles, another for the wing and tail sections and a third procedure for the fairing between a wing and a fuselage.

The important point to remember in the total justification process is that there is much to be developed for full 3-D effectiveness, although much can be done with present CAD/CAM systems and capabilities augmented with good quality analytical expertise — capabilities which greatly exceed conventional techniques.

6 Manpower Augmentation. One of the most troublesome problems of our expanding technological society is the lack of adequately qualified expertise in many fields. The need for more people with special skills at most any level is consistently outpacing the supply — in some cases, regardless of monetary and other enticements. Many excellent opportunities for new business directions and expansion of existing business are frequently foregone because of this dilemma.

Through better organization, training, standardization and other innovative concepts, many firms are attempting to utilize their manpower more efficiently. In many cases, this is successful at least to some extent. In other cases, certain elements of need may be satisfied at the exclusion of other vital needs. This phenomenon can be observed in many operations — particularly service operations where an attempt is made to run a large operation, such as a hotel, with too few people. Everything runs well unless there is a breakdown in the normal system which, of course, invariably occurs.

Part of the basis for this kind of operation is predicated on increasing profit margins for today without regard to long-terms effects. Another basis is simply the fact that qualified personnel are difficult to locate, difficult to acquire and difficult to keep. All of this relates to one key word — productivity.
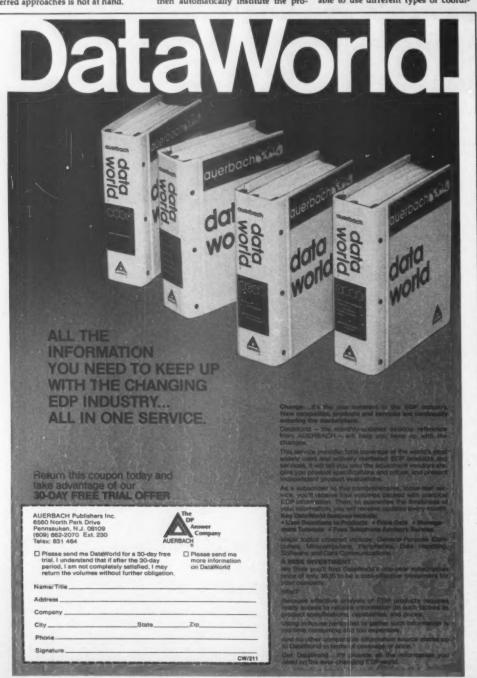
Possible Scenario

A scenario that might unfold for a given firm is the following. The company currently employs five people making piping drawings. The company bids on a potential contract which, if won, would double the requirment for making pipe drawings. This would require the immediate acquisition of five additional people primarily to perform that one function.

It is known that the company cannot acquire such skills even with a lead time of several months. Yet a multimillion-dollar contract is at stake. The company either has or can get a CAD system which improves the productivity for numerous applications including the particular application of concern. For that application, it is esti-

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MONDAY, MARCH 3

Charles P. Lecht, *President Advanced Computer Techniques and author of "The Waves of Change."*
Keynote Speaker. "The Next Twenty Years of Computer and Communications Technology."

Since "The Waves of Change" was first published in 1978, the rate of change in this industry has, in fact, accelerated. Mr. Lecht will explore the immense and varied possibilities for the Information Systems industry which technology may make possible by the turn of the century. E. G. VLSI, Josephson's Junction, bubbles, intelligent panel displays, fiber-optics, etc.

Conventional assessments of the data processing industry, preferred by industry spokesmen whose biases are well established, tell us that it is in an *evolutionary phase* — an orderly transition of some kind. Mr. Lecht maintains, "nothing could be further from the truth. A *revolution* in the way we produce, acquire and use electronic computer and communications technology is brewing, and it will result in change the magnitude of which will swamp what has thus far occurred. We are beginning 'A Great Transition' to a new era where computer and communications technology will represent a driving force for a new and beneficial industrial revolution."

Technology for the 80's:

Ian Le Mair, *Manager of Strategic Marketing (Micro-processors) Motorola, Inc.*
"The MC68000 — The Effect of High Performance Microprocessors on Computer Systems in the 80's." The combination of the microporcessor in computer architecture plus the challenge of making VLSI technology real have given birth to a new generation of microprocessors that will challenge traditional mainframes of the 1980's. The features of MC68000 and the implications of VLSI on computer systems will be discussed.

Dr. Egil Juliussen, *Senior Member Technical Staff, Texas Instruments Corporation and Dr. Portia Isaacson, Vice President EDS Business & Educational Series Corporation*
"Future Computing." Trends in hardware technology: memories, mass storage, processors, communications; applications: small business systems, information distribution; software: pricing, future languages, distribution; service/maintenance: remote diagnostics, manufacturers service, built-in testing; impacts of future technology on corporate DP.

Paul Quantz, *Manager, Computer Aided Engineering and Manufacturing Council, General Electric Company*
"The Computer Invasion of Engineering & Manufacturing." The implications of computer aided design and manufacturing on future system architecture, data management and control, software applications, software design, user interface design.

Dr. George Champine, *Vice President, Research & Product Development, Vydec, Exxon Corporation*
"The Database Processor of the Future." Database processors are specialized information processing systems tailored for information storage and retrieval. This technology is moving out of the research phase and should be in the marketplace within three years. The various approaches being pursued in database processors and the advantages and disadvantages of each will be reviewed.
Panel Discussion led by **Thor Thoresen,** *Vice President, ACT Corporation.*

Software Productivity Tools & Applications Requirements in the 80's:

Art Benjamin, *President, Art Benjamin Associates Ltd.*
What are the most significant obstacles to higher productivity in application design and development? An examination of systems architecture based on realistic concept of the "system cycle." How such an architecture can solve the major problems of development productivity and application usability.

A Japanese View of the U.S. Computer Market:

Dr. Hiromu Kaneda, *Senior Vice President, Nippon Electric Company*
Differences between Japanese and American markets; NEC's view of IBM and other U.S. competitors; the future of NEC in U.S. computer market; NEC's assessment of its own strengths as a competitor; experiences to date.

Communications Networks and Services for the 80's:

James W. Patty, *Assistant Director, Marketing Support Programs, Satellite Business Systems*
"An overview of SBS and its planned services." The current status of SBS; planned milestones; an overview of the SBS system and its features; applications and benefits of the SBS service.

AT&T (speaker to be announced)

Forum Discussion
Cocktails

TUESDAY, MARCH 4

IBM H-Series Forecast, 1980-84:

Robert T. Fertig, *President, Technology Analysis Group, ACT Corporation*
What are some of the market forces at play in the "Information Systems" marketplace? Has Grosch's law been killed or will it awake again in the 1980's? What new performance/price "standards" can we expect from the H-Series and when? How can IBM protect, grow and maintain control over its customer base during the transition to systems in the 80's? What changes in large scale system architecture, design and technology can be expected from IBM and how will this impact EDP management?

Competitor Views on Large-Scale Systems for the 80's:

Fred W. Bauer, *Director, NCR Corporation, "Design for Growth"*

John Selman, *Manager, Market Analysis Services, Honeywell Information Systems*
"Large scale systems for the 80's: The users' outlook as Honeywell views it."

Neil Gorchow, *Vice President, Sperry Univac*
"Large scale systems trends for the 80's."

How will the other major computer manufacturers maintain and improve their competitive posture in the 1980's? What changes in systems architecture, design and technology can be expected during this period and how will this impact DP management? Will the operating systems, and other software developments keep pace with the likely improvements in hardware? Will distributed processing and network nodes subtract from or add to the demand for more powerful host processors? How will the mainframe companies address the key issues of programmer and applications' productivity, and rising maintenance costs and shortage of skilled programmers/analysts.

Prospects for the Evolution of Large-Scale Systems in the 80's:

IBM (speaker to be announced)
What are some of the realistic expectations on the future of large scale systems and their effect on the data processing industry in the next decade. What are the trade-offs between small scale systems and distributed processing versus large scale products? How can management plan for an orderly transition to take advantage of the new technologies (hardware and software in the 80's)?

Industry Outlook: The Wall Street View:

Dr. Ulric Weil, *Vice President, EDP Research, Morgan Stanley, Inc.*
"The Demand Bubble." Anticipated major new product announcements; end user expenditure patterns, data processing demand; the E and H series; impact on competitors and their options; pricing as a competitive tool; IBM's current business strategy.

Office Automation: Current Experiences and Future Direction:

Dr. George Champine, *Vice President, Vydec, Exxon Corporation*
"The Integration of Word and Data Processing Within the Corporate MIS Function." Word processing and text processing systems have mechanized many of the document generation functions previously performed manually with the typewriter. The next logical step is to integrate the word and text processing subsystems into the overall corporate information system. The future roles that word and text processing subsystems can play in integrated information systems along with the functional division of activity between the work station and the main frame.

George Potter, *Director, Sales Promotion — Office Automation, WANG*
The direction of the office automation market; the integration of word and data processing; the role of office automation and electronic mail; how office automation can improve office productivity.
Panel Discussion led by **John Phillips,** *Executive Vice President, ACT Corporation*

Cocktails

WEDNESDAY, MARCH 5

The Great Transition — A Special video film Report:

Herman Kahn, *Director & Chairman, The Hudson Institute and author of The World Economic Development.*
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Strategic Planning for Distributed Processing in the 80's:

Hal B. Becker, *Manager, Distributed Systems and Networking, ACT Corporation*
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(Continued from In Depth/14) mated that VAD would increase productivity by a factor of two, that is the five present employees could double their output and thus produce the equivalent of 10 people.

Now it is quite possible that this level of productivity would not defray the amortized cost of a CAD operation. That might, for example, require a three-to-one productivity gain. Thus, the use of the CAD consoles or workstations for the immediate need would effect an actual increase in the direct cost of producing the drawings but, on the other hand, the company can acquire the contract without having to hire five more unobtainable people.

The effective manpower augmentation is perhaps one of the most important of the reasons for CAD/CAM justification. Considering the same company, what happens when the contract is completed and it becomes necessary to cut back from an effective output of 10 people to the original five? Then the five people stop using the CAD system because it is not cost effective on a direct-use basis. There is no need to cut back employment. The CAD system is then used for applications with higher productivity gains as will be discussed later in the section on direct cost benefits.

It should be evident that systems which enhance productivity enable the user organization to moderate manpower changes, both increasing and decreasing, irrespective of other benefits and direct cost savings.

The preceding six sections on CAD/CAM justification do not by any means exhaust all of the attributes that should be considered by any enlightened organization. There is no doubt that users can cite many other areas of justification as well as many examples to further substantiate and endorse the points that have been made.

Of course, there are some practical concerns that may tend to mitigate against CAD/CAM. Such concerns are usually more organizational than technical. To reach the potential of CAD/CAM, an effective organizational structure must be set up, operational procedures must be established, appropriate personnel assignments must be made, employees must clearly understand the role of the new systems and management must set policy that will be consistent with and will cope with expanding technical needs. Some organizations may not feel up to the task of meeting those demanding requirements.

However, inaction is tantamount to negative action in comparison with the motivation and action of competitors. Therefore, it is essential that all potential users of CAD/CAM system bring themselves up to date as soon as possible so they can more accurately assess their true potentials.

No matter how thorough we try to make the case for justification, there is every reason to invoke the iceberg principle as in most fields of endeavor — i.e., there is probably 10 times more

value in CAD/CAM systems than can be conjectured by the protagonists.

The one big remaining area of justification is in direct cost reduction or saving which is often called cost-effectiveness or cost benefits.

7. Direct Cost Benefits. Because of the nature of the six areas of justification that have been discussed to this point, pure direct cost-effectiveness may be a lesser basis for justification. However, to some extent, it is easier to quantify, although by no means is it

easy, per se.

If a case can be made to show that CAD/CAM produces cost savings, then all of the other areas of justification are like frosting on the cake. Cost savings in this sense are the most conservative approach. It is certainly a result that nontechnical management and financial people can readily understand.

For the more conservative organizations, a case for CAD/CAM acquisition might not be made any other way,

irrespective of the implicit, inherent values discussed in the six other areas of justification. These practical factors are the reasons that most potential users are more interested in acquiring hard data that unequivocally makes their case than they are in anything else.

But such data is not readily available. A paper by this author presented at the National Computer Conference in 1975, a subsequent paper by Aaron *(Continued on In Depth/18)*

IN DEPTH

Fedder of Northrop at an American Institute of Aeronautics and Astronautics Conference and other presentations by Carl Machover of Machover Associates have attempted to give specific experience data. Such data is, of course, not conclusive evidence. Accurate data is expensive to acquire, and it is difficult to set up controlled comparisons between conventional techniques and CAD/CAM techniques.

Second, when controlled tests are established, they often cannot meet the rigor of scientific testing. This is because other more immediate needs get higher priority, conditions change, personnel change, facilities change, management changes and motivation changes. All of these factors affect the comparison process and the results that are deduced.

Furthermore, the measurement of job time is not always as simple as it would seem. The inferences drawn from so-called "controlled" statistical tests are influenced by parameters that range from difficult to impossible to truly control.

Therefore, the best comparisons are generally drawn from the more-or-less subjective observations of the relatively few people who have made it a point to learn the true value and potential of CAD/CAM productivity.

Given this background, it is noteworthy that a general agreement about levels of productivity gain has developed. Years of observation and study have produced a high level of confidence in the comparison of productivity between CAD/CAM and non-CAD/CAM systems.

Sylvan H. Chasen is a staff scientist in advanced design at Lockheed-Georgia Co., Marietta, Ga.

A former math instructor at Georgia Tech, Chasen gained his first applied computing experience in 1956 as head of the first Naval Air Test Center Computing Facility. In the early '60s he directed one of the earliest projects dedicated to interactive computer graphics and CAD/CAM. Since then he has held leading positions in analysis, mathematical statistics and operations research as well as computing.
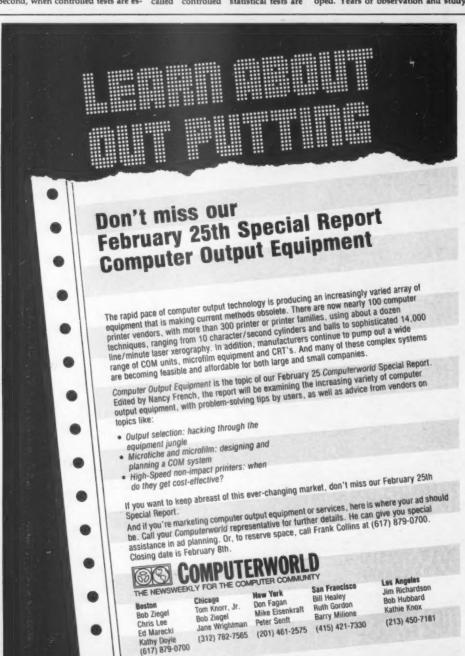
Chasen is the author of Geometric Principles and Procedures for Computer Graphic Applications (Prentice-Hall, 1978) and is a coordinator and lecturer on computer graphics and other topics at extension courses of the University of California at Los Angeles held at the University of Maryland.

James W. Dow is supervisor of technical engineering methods at The Southern Co. Services in Atlanta, Ga., the service arm of The Southern Co., a public utilities holding company.

Dow began his activities in the field when he assumed technical responsibility for implementing large structural analysis models in 1972. Since 1974, he has consulted on the evaluation and implementation of numerous CAD/CAM systems for several corporations.

Dow has written extensively on CAD/CAM systems and interactive computer graphics.

Part 1: Transparency

SURVIVABLE SYSTEMS

Figure 1-1

Once upon a time, a funny thing happened to IBM. Hardware costs fell and software costs soared. And unbundling became the law of the land.

This emergence of software as the Achilles' heel of system cost and development time has laid the groundwork for a significantly new system design philosophy. We no longer look for the most cost-effective hardware to do the job, being willing to rewrite the software as applications change and usage increases. Rather, the initial software development costs and ongoing software maintenance costs are becoming a significant factor in system choice.

As the trend to cheaper hardware and more expensive software continues, the appeal of a system in which new applications or increased loading can be accommodated by simply adding hardware with little software effort becomes more and more irresistible.

Adding hardware means many things, including adding processing capacity via additional processors. Suddenly, we find ourselves in a multiprocessor environment, and almost for free a new opportunity arises — system survivability.

We define a survivable system as one which performs *functionally* the same in the presence of any single hardware failure (and often in the presence of multiple failures). Except for some loss of capacity, the user should be unaware of a failure. He will be equally unaware of the return to service of previously failed equipment, except perhaps for an improvement in the responsiveness of the system.

Question of Affordability

Survivable systems will only become common when they become affordable. This means not only that the cost of hardware must drop to the point where its proliferation is not cost significant, but also that the functions of survivability, expandability and all the other advantages of a multiprocessor system become transparent to the user.

Hardware is already doing its part. And multiprocessor operating systems are now becoming available that provide the functions of system transparency and survivability, allowing the user to concentrate solely on his application. To date, there has been only one such operating system that has enjoyed commercial success — the Guardian operating system from Tandem Computers, Inc. This is an excellent example of a classical system in today's operating system art and provides the basis for this tutorial discussion of survivable systems.

This discussion will not dive into the

This is the first installment in a five-part series.

---

theory of operating systems, nor even into the internal workings of an operating system such as Guardian. Rather, the *environment* created by the operating system will be examined from the user's perspective. This environment will be explored with respect to what it offers in terms of system flexibility, expandability and survivability.

One of the problems of such an operating system is that it is big and potentially cumbersome. We will dwell heavily on the analysis of the throughput and responsiveness of these systems, paying particular attention to design considerations that will maximize the system's capacity.

However, the very size of the operating system brings the advantage we are looking for — cheaper software. We will find that the user need only concern himself with implementing a straightforward single-user application. The operating system will expand that application to a multiuser program running in a multitasking, multiprocessor, highly survivable environment.

Our discussion of survivable systems is separated into five parts. The first three parts provide the concepts necessary for understanding these systems:

Part 1, "Transparency," introduces the "process" as the fundamental logical unit at an applications level. Communication between processes provides the mechanism which allows processes to be unaware of the specific configuration of the distributed multiprocessor network in which they are running.

Part 2, "Process Structure," de-

By Wilbur H. Highleyman

IN DEPTH

scribes the role of a process in a multi-processor system and explores its structure. Those characteristics of a process which are fundamental to the twin goals of survivability and reduced software complexity are highlighted.

Part 3, "Process Management," presents the mechanisms for sharing limited processor resources among concurrently executing processes. It is these mechanisms which allow a process to be unaware of its environment and which lead to the ease of implementing multiuser applications running in a multitasking, multiprocessor environment.

The last two parts deal with the application of these concepts:

Part 4, "Survivability," shows the extension of these concepts to create applications which are fault-tolerant. Any single system failure (and many multiple failures) may be made transparent to the user population.

Part 5, "Throughput," uses a series of examples to illustrate how to determine and improve system capacity over an order of magnitude range.

Part 1 — Transparency

In order for a multiprocessor system to be completely general-purpose, the first and foremost requirement is that the user must not be required to be aware that it is a multiprocessor system. When preparing his programs, he should not be concerned with which processor he will be running on or to which processors the various peripherals he will be using are connected.

The operating system must provide all the features required for any program running on one processor to communicate with any peripheral device or any other program running on any other processor. This characteristic is called *transparency;* it hides the intricacies and complexities of the multiprocessor environment from the user and allows him to treat the system as if it were a single processor.

The Process

The concept of transparency is illustrated in Figure 1-1 (on In Depth/19). Let us consider a simple data base inquiry program. To the user, this is a program that accepts an inquiry from the user terminal, accesses a data base stored on disk and returns a response, as show in Figure 1-1a. In a single-processor system, Figure 1-1a might be a good representation of the physical paths involved in the application.

In a multiprocessor system, Figure 1-1a represents how we would want to view the application *logically.* However, the *physical* representation might be quite different, as shown in Figure 1-1b. Here the application is running in a four-processor system. The operator's terminal is physically connected to Processor 1, the inquiry program is physically running in Processor 3 and the disk is physically connected to Processor 4. Via the interprocessor bus, however, the terminal is logically connected to the inquiry program, which is logically connected to the disk. It is the logical connections that are apparent to the user (Figure 1-1a); the physical connections (Figure 1-1b) are transparent to him in that he doesn't necessarily know which processors are involved in his application.

Thus, the operating system provides transparency if the application program requires no advance knowledge of the system configuration. The identical inquiry program shown in Figure 1-1b would support a terminal connected to Processor 2 communicating with a disk on Processor 1, while it itself ran on Processor 4, and so on.

Since the physical processors are immaterial in the design of an application for a truly transparent system, let us restructure our thinking a little by defining the following:

• A *processor* is a physical piece of hardware comprising logic and memory.

• A *program* is a physical set of object code, probably residing on a disk connected to some processor.

• A *process* is a program running in a processor. (There is nothing to restrict multiple copies of a program from running in one or more processors, thus creating several like processes, each perhaps handling a different terminal but otherwise providing the same application as its brother processes.)

• *Physical* means the way things really are.

• *Logical* means the way things appear to the user.

Thus, a process is the logical result of a physical program running in a physical processor. The user sees the application provided by the process; he is not aware of which physical processor he is using, nor of where his physical program resides.

A process, then, is the basic logical unit within a multiprocessor system. Each logical task is handled by a process. To the user, there are two types of tasks to be performed, and therefore two types of processes: application processes written by the user, and device-handling processes provided by the operating system.

I/O Processes

We have already talked about application processes. Device-handling processes, or I/O processes, are typically considered part of the operating system, but are in fact identical in structure to application processes. Their job is that of the classical device handler — they handle transfers to and from their respective devices (writes and reads), as well as other control functions, in response to requests from application processes. They differ from application processes only with regard to certain restrictions:

• An I/O process must reside in the same processor to which its corresponding device controller is attached.

• An I/O process cannot originate communication to another process (except to its backup, as described later); it can only respond to requests from other processes.

• An I/O process can execute I/O instructions, whereas an application process cannot.

Thus, the inquiry application of Figure 1-1 does not involve just the application process. It also involves a terminal I/O process and a disk I/O process. The logical structure of the application is therefore better represented by Figure 1-2. Here, the physical interprocessor bus has been replaced with a logical interprocess bus. Application processes are shown above the bus and I/O processes below the bus.

Figure 1-2b shows a more extended application in which orders are entered from several terminals. The order entry processes (one per terminal) access various files on disk to verify and build the order on disk. Once an order is complete, the common invoice process is informed so that it can print an invoice on the printer. It reads the disk-resident invoice file and prints the requested invoices. (Note: An application process can be designed to handle a single terminal as above, or multiple terminals. Considerations for this choice are given later.)

The example of Figure 1-2b shows that application processes not only communicate with I/O processes, but also with other application processes. (An I/O process will never communicate directly with another I/O process, since an I/O process cannot initiate a communication; it can only respond to one.) In fact, *except for its internal processing, the only thing an application process can do is communicate with another process.* As we shall see, it is the simplicity of this statement of the role of a process that leads to the elegance of the Tandem-like multiprocessor structure and forms the basis of the transparency and survivability functions.

Interprocess Communications

Let us now look in more detail at interprocess communications. One process communicates with another by sending it an interprocess message. To do so, it merely provides to the operating system the name of the process, the content and length of the message and whether a response is required.

Note that this leads to three types of interprocess messages. Using Tandem's nomenclature, these are:

• WRITE — A message is sent to another process with no response required (except for completion status; that is, successful or error condition).

• READ — A null message (that is, no data, length of zero) is sent to another process, with a response expected.

• WRITEREAD — A message is sent to another process, and a response is expected.

In the example of Figure 1-2b, an order entry process might return information to its terminal and wait for the next operator entry; this is a WRITEREAD interprocess message. When it receives data from the operator, it may verify or expand certain information such as part number by sending READ messages to the disk process, which will read requested data from the disk and return it to the order entry process.

The order entry process may then write invoice data to disk by sending WRITE messages to the disk process and will then inform the invoice process that the invoice is ready by sending it a WRITE message. The invoice process will READ the invoice from the disk process and print in by sending WRITE messages to the printer process. Note again that I/O processes

SURVIVABLE SYSTEMS: PART 1
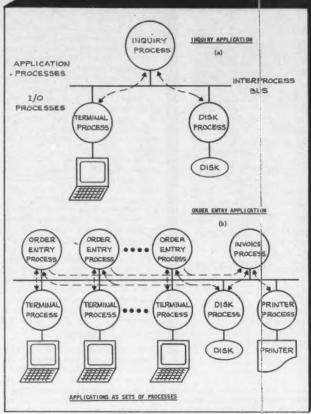
Figure 1-2

Figure 1-3

never send interprocess messages; they can only respond to them.

In order to support interprocess messages, the system must provide three facilities:

• A hardware path interconnecting all processors, with supporting software.

• A provision to assign a unique name to each process.

• An operating system capability to know in which processor each process is currently operating.

Interprocessor Paths

The hardware path can be implemented in any one of a number of ways, as shown in Figure 1-3. Each has its own advantages and disadvantages:

• The bus is simple, but must resolve contention and carry the entire multiprocessor load.

• The ring can use different paths simultaneously, but places a load on processors not involved in the message.

• A star can use different paths simultaneously, but requires additional hardware — the switch. The switch must carry the entire multiprocessor load.

• A fully connected system provides maximum capacity, but requires N-1 bus connections at each processor for an N-processor system.

• A partially configured system is application-dependent.

No matter which network is chosen, the important fact is that it is transparent to the user. We do not care how an interprocess message physically gets from one process to another as long as it logically gets there.

In Tandem's case, the bus network is used; up to 16 processors can be connected to a single bus. The problem of handling the entire multiprocessor load is solved by using a very high-speed bus (13M byte/sec). In fact, for survivability purposes, two buses are provided, so that the system continues to operate even in the presence of a bus failure.

Process Names

The next facility required is that of process names. A process is named when it is "created." A process is created at the request of an operator command or at the request of another process. Creating a process causes the operating system in the CPU in which the process is to run to schedule that program (that is, object code on disk) to be rolled in to memory and run as the named process. A typical Tandem command to run a process might be: RUN ORDER / NAME $ORDER1, CPU 3, PRI 150 /.

This command would cause the program whose physical object file name (on disk) is ORDER to be run on physical Processor 3 as a logical process named $ORDER1 at priority 150.
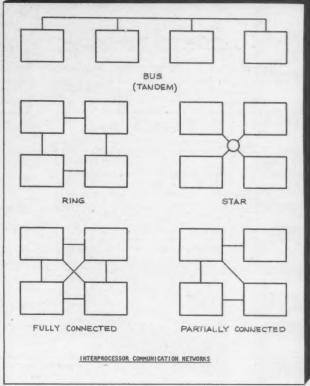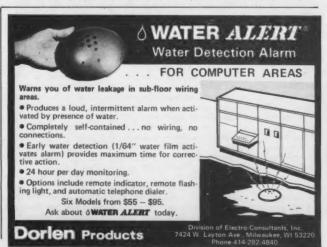
(If the CPU were not specified, the process would run on the same CPU as the creating terminal or process. If the name were not specified, an arbitrary unique name would be assigned, but no process other than the creator would know this name, and therefore no process other than the creator could communicate with it. If the priority were not specified, a default priority would be used.)

Process Directory

Finally, the operating system must know in which processor each process is operating. Whenever a process is created, all processors are informed of this event (via the bus). Each processor maintains a process directory that contains the name of each process and the CPU in which it is currently running. I/O processes are created at system generation time, and are permanent entries in the process directory.

An exception to this is disk files. A disk I/O process controls one physical disk controller. This controller may be connected to several physical disk units; many named disk files are on these
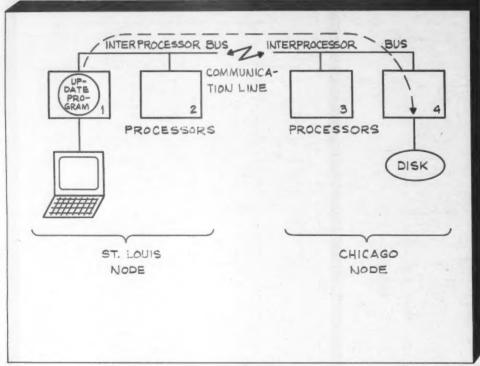
IN DEPTH

Figure 1-4

(Continued from In Depth/21) disks and are therefore accessible through a common disk process. However, the application program will want to reference a file by its name; it doesn't need to know the name of the disk process with which it must communicate in order to reach the physical disk containing that file.

Disk files are typically organized into volumes, each volume being handled by a specific disk process. The name assigned to a disk process is in fact the name of the volume it is handling. When a request is made to read or write a disk file in a given volume, the process directory is searched to determine the process and CPU handling that disk volume.

Thus, when a process wants to send an interprocess message to another process, its local operating system looks up the process name in its process directory, finds the CPU in which that process is running and, if it is in another processor, sends the message over the interprocessor bus to the receiving process. If a response is expected, it will return that response to the transmitting process when it is received.

Note that the process itself need have no knowledge whatsoever of where other processes reside, nor how to get a message to other processes. These functions have been totally handled by the operating system, thus providing the transparency we desire.

(Considerable tutorial license is being taken with respect to the handling of process names. Under Tandem's Guardian, for instance, a named proc-

ess is first "opened" by a process that wishes to communicate with it and is then referred to by a more efficient file number which is assigned by the operating system. Processors know processes not only by name, but by a process identification number (PIN) carried in the directory. Finally, a logical device table performs the functions of the process directory for I/O processes created at system generation time, including disk I/O processes named after their volumes.)

Process Mobility

The fact that a process may be mobile (that is, move from one processor to another) leads to two important characteristics of multiprocessor systems:

• Load sharing. The creator of a process can request the status of all processors and can then create the process in the least loaded processor. It is common practice among Tandem programmers to display the status of all processors before deciding in which processor to run a compile, edit or other utility.

• Survivability. Process mobility allows us to re-create a process (or switch to a backup process) if another processor that was running that process has failed. This subject will be dealt with in depth later.

Geographical Transparency

A final point should be made about system transparency. As we have said, the user is unaware in a truly transparent system of where the various peripherals and processes are in a multiprocessor system, because he is un-

aware of the mechanism involved in routing a message from one process to another. In Tandem's implementation, this mechanism involves the high-speed interprocessor bus.

Though the high speed is necessary to achieve good system throughput, that is the primary reason for its speed. There is no logical reason why part of the bus could not be a slower communication line, allowing geographical separation of groups of processors. The system of Figure 1-1b might be distributed as shown in Figure 1-4. This provides a geographical distribu-

tion for a large system, which can offer many advantages:

• The use of a common corporate data base without excessive line costs.

• Load balancing in a large geographically distributed system by running large jobs at the least loaded node.

• Printing of reports at the user's site, even if the data base is remote.

• Message delivery among all users of the distributed network.

• Local control over local processing capability while having access to the network for load sharing and data base access.

This distributed system requires no substantial effort on the part of the user, since the same transparency concepts of interprocess communication hold as described previously. It is only necessary for the operating system to be able to know the geographical node as well as the processor in which a process is running via the process directory.

Tandem's Expand package provides just this facility. With Expand, one can support a network comprising up to 255 nodes, each containing up to 16 processors. This represents perhaps the ultimate application of system transparency.

Summary

We have seen that multiprocessor transparency has been achieved by considering an application as a communications network. The nodes of the network are the processes which communicate with each other via interprocess messages over an interprocess bus.

As in any communications system, node or path failures may cause loss or duplication of messages; this is one of the major considerations when we discuss survivability. Also, communication path delays and queuing at the nodes impose a limit on the capacity of the system; this will become the basis of our throughput analysis.

Next week: Process Structure and Process Management.

Dr. Wilbur H. Highleyman is president of Sombers Associates, Inc., Mountain Lakes, N.J., a firm specializing in minicomputer and microprocessor turnkey software. He is also chairman of MiniData Services, Inc., a service company.

Previously, Highleyman was responsible for Data Phone development at Bell Telephone Laboratories and was a cofounder of Data Trends, Inc. He has been instrumental in the design and implementation of survivable systems for the graphic arts, communications, financial and wagering industries.

Highleyman holds a B.E.E. degree from Rensselaer Polytechnic Institute, an S.M.E.E. degree from Massachusetts Polytechnic Institute and a D.E.E. degree from the Polytechnic Institute of Brooklyn. He holds four patents and has published extensively on pattern recognition, communications and business minicomputers.

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LOS ANGELES — As any kid will tell you, sharing is fine, but having your own toy or piece of candy is even better.

The same basic philosophy of ownership — more or less — is adhered to by an oil and gas company here that switched from renting computer time on the same equipment with several other companies to installing its own DP system.

McCulloch Oil Corp. purchased two Hewlett-Packard Co. 3000 minicomputers to coordinate activities between its numerous district offices and to handle new exploratory applications. Since the systems' installation, the company has slashed its overall DP equipment costs by about 40% and significantly reduced its critical report lead time, according to C.W. Dyson, vice-president and general manager of McCulloch Information Systems, Inc., the company's wholly owned subsidiary.

McCulloch specializes in domestic oil and gas exploration and production and sells wholesale at the well head to a number of major oil companies. In addition, the company is developing geothermal wells in the geysers area near San Francisco and is involved in gas processing in the western states. McCulloch is the operator of a coal mine in Utah, extracting about one-and-a-half-million tons of low sulphur coal per year.

Unique Scheme

However, the Los Angeles-based company has a rather unique way of doing business: it uses the capital raised through the formation of investment partnerships to finance its operations. Therefore, keeping track of these partnerships is crucial to the company's continuance.

Before beginning a project to explore for an energy source and develop a well, McCulloch takes a small oil company or individuals as partners. The companies or individuals involved in the partnership frequently have the option of entering into either an exploration or development agreement.

The former involves a relatively high degree of risk, but offers the potential of a substantial profit. The second option is less risky, offering the investor a good income as well as a tax shelter.

Each year, the company forms several investment programs consisting of a number of limited partnerships and has had as many as 200 participants in a single geothermal or oil limited partnership. Currently the company has approximately 8,500 such limited partners.

File Processing

McCulloch Oil's financial system uses a file processing technique analogous to a manufacturing company's concept of bill-of-materials processing. Every accounting transaction is exploded down to the different levels of ownership or investment and imploded back up to form the financial picture as a whole.

The company's financial data base, maintained on an HP 3000 Series III computer at company headquarters, is structured so that the data, after explosion, is maintained and is available at many different levels. A user of the system is able to ascertain immediately the status of each party involved in a specific transaction.

For example, if a pump costing $1,000 has to be replaced on a drilling unit, the HP 3000 Series III computer can allocate the cost according to the six levels of investment participation involved in the drilling project. Included are the general partners, outside parties, joint ventures and the various partnerships and their participants.

By computer, the particular transaction is first related to a specific lease. Then, through links in the data base, this expense *(Continued on Page 58)*

Dan Hilburn, manager of operations and programming at McCulloch Oil Corp., scans printout from one of firm's two HP 3000 systems.

Business Unit Does Number Crunching

SAN CARLOS, Calif. — Artec Computers, Inc. has introduced a microcomputer-based small business system that incorporates a floating-point math chip for number-crunching tasks.

The 8-bit Centurion system is built around Intel Corp.'s 8085A-2 microprocessor. Aided by the math chip, it processes data six times faster than conventional 8-bit machines, Artec claimed.

Geared to perform large numbers of relatively simple computations, the system can reportedly be used in the preparation of sales statements and income tax returns or to monitor a user's inventory.

The Artec Centurion features 16K bytes of internal programmable read-only memory, 64K bytes of random-access memory, a floppy disk controller and Digital Research, Inc.'s CP/M operating system. The unit operates with a CRT terminal and up to four single-sided, double-density floppy disk drives; it is compatible with any printer using an RS-232C interface, a spokesman said.

The system is available in three configurations. The Model I includes a 16-slot microcomputer, a Hazeltine Corp. 1500 or 1420 CRT terminal and a separate enclosure with two Shugart Associates 8-in. disk drives and a power supply.

PDP-11, SMD Drives Linked

SUNNYVALE, Calif. — A single-board disk controller from Ball Computer Products is said to interface any Digital Equipment Corp. PDP-11 series processor with up to four storage module disk (SMD) or SMD-compatible drives.

The Model 3211 emulates DEC's RM-02 controller, providing compatible formats and interchangeable media without modification to the PDP-11's operating system software disk driver, a Ball spokesman said.

The host-resident controller mounts in a single slot of the PDP-11 motherboard. Direct access to memory for all read/write block transfers is accomplished using the nonprocessor request DEC Unibus facility, according to the spokesman.

Requiring only one Unibus load, the unit can be strapped to any arbitrary priority level, interrupt vector address and device register address, he added.

The Model 3211 handles data rates from 806K- to 1.2M byte/sec and has a 2K-byte data buffer memory that is said to reduce the required data transfer rate with the host processor.

Finally, the controller incorporates such features as overlapping seeks, an implied seek function, sector interleaving and multiple sector transfers. It costs $3,950; quantity discounts are available, Ball said from 860 Arques Ave., Sunnyvale, Calif. 94086.

Printer Features Self-Diagnostics

ANAHEIM, Calif. — General Automation, Inc. has introduced a microprocessor-controlled impact band printer that features built-in self-diagnostics and a removable steel print band.

Available in either a 300- or 600-line/min version, the 3450 Model replaces GA's 600 line/min Model 3353. The 3450 incorporates friction-free hammers, integrated circuit hammer drivers and a variety of internal sensors that monitor paper and ribbon movement, a spokesman said.

The GA 3450's print band has a 64-char. standard upper case set that can be interchanged with an optional 96-char. band with lower case characters. The printer also has an integral electronic vertical format unit (Evfu) that gives the user's software program control of forms length and line skips, the spokesman noted. The Evfu eliminates the need for carriage control tapes.

A digital display monitors the machine's status and allows operators to identify and correct local system faults.

Prices for the 3450 start at $10,750, depending on the printer speed. GA is at 1055 S. East St., Anaheim, Calif. 92803.

The Artec Centurion

The Model II includes the microcomputer, but with an eight-slot motherboard, and two 8 in. disk drives — all housed in a single enclosure. The Model III includes the microcomputer with eight slots, but two 5.25-in. disk drives instead of the full-sized floppies.

An additional 1M byte of disk storage capacity in the form of two 8-in. disk drives and a power supply, in a separate enclosure, can be added to the Models I and II, the spokesman noted.

The Centurion I with Hazeltine's 1500 terminal costs $10,825; the Model II is priced at $9,500 and the Model III costs $8,025. The optional 1M byte of disk storage costs $2,500. Artec is at 605 Old County Road, San Carlos, Calif. 94070.

MINIWORLD

Brand Preference Study 1977

Brand Preference Study 1978

Brand Preference Study 1979

Brand Recognition Study 12th Edition 1978

Brand Recognition Study 13th Edition 1979

silent 700
electronic data terminals
Model 733 ASR
Data Terminal

silent 700
electronic data terminals
Model 743
Data Terminal

silent 700
electronic data terminals
Model 745
Portable
Data Terminal

silent 700
electronic data terminals
Model 781 RO
Printer

silent 700
electronic data terminals
Model 783 KSR
Data Terminal

silent 700
electronic data terminals
Models 785/787
Portable
Data Terminals

BRAND
PREFERENCE

THERMAL

silent 700
electronic data terminals
Model 763
Bubble Memory
Data Terminal

silent 700
electronic data terminals
Model 765
Portable
Bubble Memory
Data Terminal

omni 800
electronic data terminals
Model 820 KSR
Data Terminal

omni 800
electronic data terminals
Model 820 RO
Printer

omni 800
electronic data terminals
Model 825 KSR
Data Terminal

omni 800
electronic data terminals
Model 825 RO
Printer

omni 800
electronic data terminals
Model 810 RO
Printer

MEMORY

IMPACT

Interface Subsystem Ties CPUs, DEI Tape Drives

FRAMINGHAM, Mass. — Alloy Engineering Co., Inc., has introduced an interface subsystem that allows a host RS-232C computer port to be hooked up with multiple Data Electronics, Inc. (DEI) cartridge tape drives.

Alloy's DRS-232 operates as a transport binary storage unit, packing and transferring data between the computer and DEI's high-density DC-300 tape drives. Storage capacity is reportedly increased by up to 13.4M bytes, with transfer rates up to 175K bit/sec.

The subsystem provides off-line copy firmware that lets users make distribution or archival copies of tapes without host computer interaction, a spokesman claimed.

The subsystem consists of an interface, power supply and an optional table cabinet or rack mount. Typical applications include disk backup and mass storage and spooling.

The DRS-232

The DRS-232 is priced from $2,850, including a single cartridge drive. Alloy Engineering is at 85 Speen St., Framingham, Mass. 01701.

Micru Elects Officers

ROLLING MEADOWS, Ill. — Micru International, an association of Microdata Corp. users, recently elected officers and the organization's first board of directors at its annual meeting in Chicago.

William A. Anderson of Katy Industries in Elgin, Ill., was elected president. Susan Greenwald of Century 21 Real Estate Corp. in Irvine, Calif., and William J. Pailey Jr. of Pailey Computer Specialties in Arlington Heights, Ill., were voted in as vice-president and secretary/-treasurer, respectively.

The nine Micru members elected to serve one-year terms as directors on the association's board were in addition to Anderson; Greenwald and Pailey, Chet R. Goodwin of Bachi, Inc. in Itasca, Ill., John A. Hinckley of Toronto's Braemore Group, James E. Prestridge of Nasco, Inc., in Springfield, Tenn., Bernard F. Schick from Selecto Flash, Inc. in Orange, N.J., Frank J. Tabaczynski of A.L. Damman Co. in Sterling Heights, Mich., and Donald J. Wood of the Deseret Book Co. in Salt Lake City.

One of the boards first actions was to finalize plans for Micru's Winter Conference, which will be held Feb. 18-21 in San Diego.

Dual Minis Pump Savings for Oil Firm

(Continued from Page 55)
can be exploded down through all of the specific levels of ownership including the partnerships and their investors.

Conversely, the transaction is imploded upwards through various levels for overall accounting financial reporting.

The reason for such detailed breakdowns, Dyson continued, is to determine the exact financial investment involved for each party entered in the transaction. "The new computer allows us access to this information anytime we need it.

"Before, the process was a lot more time-consuming and the information was available only at the end of the month," Dyson added.

In the majority of partnership agreements, the general partner invests more money than do the limited partners. Consequently, when the time arrives for a payout, the general partners get a larger amount back in the early payments. When their initial investment has been returned, the computer begins to switch the larger payout amounts to the limited partner investors.

Second Machine

The HP 3000 Series III, located along with the HP 3000 Series II at McCulloch's headquarters, handles all word processing, payroll, personnel and systems development.

Word processing is another new application the company instituted at the time of purchase of the HP 3000 computers. Any lengthy document coming through the business office, including procedures and user documentation, goes through the HP 3000 Series II for word processing.

According to Dyson, having the in-house system has been a real asset to McCulloch. "It's definitely saving us money over the old method," he said.

Communications Links
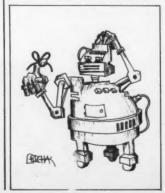
The two computer systems are tied together via two communications lines. Users of the 45 terminals spread among five states are never aware which HP computer is processing their work.

Not all of McCulloch's savings have been realized at the company's headquarters. According to Dyson, noticeable savings have been seen in the company's Utah coal mine since switching to the HP systems. The mine now shows savings in DP costs of some $7,000 per month using two of the 45 terminals connected to the two main systems.

District offices for McCulloch Oil are located in Houston, Oklahoma City, Okla., Bakersfield, Calif., and Casper, Wyo.

Before purchasing the Hewlett-Packard equipment, McCulloch had no direct computer tie-in with the district offices. Data forms were filled out and sent through the mail, increasing the time to process information and the possibility of errors, Dyson observed.

Now, dial-up lines hook all of the district offices to the computer systems at headquarters, a capability not previously enjoyed by the company.

The Nestar Cluster/One Model A

Nestar Extends Cluster/One To Handle Up to 64 Apples

PALO ALTO, Calif. — Nestar Systems, Inc. has beefed up its Cluster/-One local networking system for microcomputers by adding a version it said handles more than four times the number of Apple Computer, Inc. machines than its predecessor.

Like the nontime-sharing predecessor, introduced early last year, the Cluster/One Model A allows groups of Apple micros to share data, access the same files and communicate with one another at distances up to 1,000 ft. Also, like its predecessor, the Model A lets banks of microcomputers utilize the same printers, plotters, data recorders, graphics tablets and other peripherals.

However, unlike its counterpart, the expanded Cluster can link up to 64 rather than 15 microcomputers. In addition, it features double-sided 8-in. floppy diskette drives that effectively double the 630K-byte storage capacity of the previous model's single-sided units.

Moreover, the latest system can be fitted with a Winchester-type hard disk subsystem that delivers a total formatted data capacity of about 16.5M bytes, a spokesman stated.

The basic Model A consists of the

floppy diskette drives with more than 1.2K bytes of storage, a disk interface for the Apple II microcomputer, a Clusterbus interface, power supply cooling system and system software. It costs about $6,000, compared with the previous version's price tag of $4,500.

The Winchester nonremovable hard disk sells for $7,995 and includes a disk interface, power supply and a cooling system. Extra communications cards, required for each added microcomputer, costs $395 each.

Like last year's Cluster/One, the Model A must have a dedicated Apple II microcomputer to act as a "system manager" over the other computers, the spokesman noted from Nestar at 430 Sherman Ave., Palo Alto, Calif. 94306.

Cassette Ribbon Fits 700 Printer

HUDSON, N.H. — Centronics Data Computer Corp. has unveiled a long-life cassette ribbon for its 700 series of impact dot matrix printers.

Called the 7-Meg, the cassette reportedly prints seven million to 10 million characters before it requires replacement. It is installed by snapping the cassette over the printer head.

The cassette ribbon is now included as a standard feature on all Centronics' high-speed 700 models. Present owners of the 702, 703, 704 and 753 printers can have their machines adjusted to fit the cartridge by contacting one of the company's field service centers. The cartridges sell for $18 each, a Centronics spokesman said from 1 Wall St., Hudson, N.H. 03051.

Datasystems Outlines Controller for DG

SAN DIEGO — Datasystems Corp. has released a one-page data sheet containing the features and specifications of its DLP-2200 line printer controller, geared for Data General Corp. Nova and Eclipse minicomputers.

The sheet is available free from Datasystems at 8716 Production Ave., San Diego, Calif. 92121.

CDC to Repair Atari Micros

MINNEAPOLIS — Control Data Corp. (CDC) and Atari, Inc. have signed an agreement under which CDC will furnish repair services for the microcomputer manufacturer's line of personal computers through its nationwide network of repair centers.

Under the terms of the agreement, CDC has assumed repair responsibilities for Atari's models 400 and 800, including warranty services, safety and engineering changes, equipment upgrades and annual service contract work.

Approximately 20 CDC/Atari centers are now open in California, Colorado, Florida, Georgia and other points across the country, with more openings scheduled for the first quarter of this year.

COMPUTER INDUSTRY

City Councils Chip Away At Silicon Valley's High Density

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — The days of unrestricted industrial development in Silicon Valley may be coming to an end amid increasing speculation that the area is fast approaching the limits of its capacity to grow.

Cries for a halt to the region's runaway industrial expansion are winning an increasingly sympathetic ear in the highest echelons of local government both here and elsewhere in Silicon Valley.

Last month the Sunnyvale City Council adopted a resolution calling for a four-month moratorium on all new industrial construction exceeding 25,000 square feet. Council members approved the ban — the first of its kind in Sunnyvale's history — to give themselves time to study the community's growth-related problems and recommend possible solutions.

Then, only one week after the Sunnyvale action, a similar freeze on industrial construction was okayed by the Planning Department in neighboring Palo Alto. Planning Department members have forwarded their proposal to the Palo Alto City Council, which is expected to vote on the recommendation early this month.

With industrial expansion seemingly under attack in two of its key strongholds, some local business leaders have expressed concern that moratorium fever could spread to other Silicon Valley communities and even threaten the area's position as the high-technology capital of the world.

Over Credit Collection System
Turnkey Vendor Locks Horns With CDC

By Tim Scannell
CW Staff

PARMA, Ohio — C.H.S. Systems, Inc., a supplier of turnkey minicomputer and microcomputer-based systems that until recently incorporated Control Data Corp.'s Cyber 18 line, is in the market for a new computer vendor. But not by its own choice.

About 18 months ago, C.H.S. began marketing a turnkey credit collection system based on CDC's top-of-the-line Cyber 18-30 machine, called Cyber Credit. The nine-employee firm had two people working almost full-time drumming up customers and invested about $25,000 to $30,000 in marketing.

When C.H.S. tried to sell the system to some prospective customers, however, CDC refused to deliver the hardware/software package, stating that it "didn't feel systems houses should be selling its credit collection system," according to Jim Hill, C.H.S. president.

"People were at the point where they were ready to buy," he recalled, and "CDC suddenly told us that we were not authorized to sell it and it would not accept the order."

CDC informed Hill that it would market the credit collection system directly to the end user and, consequently, withdrew and refused to renew C.H.S.' entire contract for the Cyber 18.

"We're currently scrambling trying to line up other suppliers," Hill said.

A spokesman for CDC, however, denied that C.H.S. was ever told to market the specialized computer and added that the company's marketing policy has never been to offer a complete system to its systems house customers.

Until the middle of last year, CDC did have an agreement with C.H.S. to provide hardware and software on a volume basis; the turnkey integrator would then combine these two elements into a single package and sell the finished product to a third party, the CDC spokesman said. "However, this agreement did not provide for the sale and remarketing of this credit collection system" which is, in effect, a complete and ready-to-view package, the spokesman pointed out.

Hill disagreed with CDC's version of the marketing story. Although he admitted there was never any written agreement stating that his company should promote and sell the Cyber Credit package, he said there was a verbal contract.

According to Hill, CDC told C.H.S. some time ago that it could market Cyber 18 equipment and "certain software

Olivetti Gets Rights to Sell IBM-Compatible CPUs in Europe

WALTHAM, Mass. — IPL Systems, Inc. has signed a nonexclusive agreement with Olivetti Computers of Rome under which the wholly-owned subsidiary of Olivetti Corp. will market and support IPL Systems' 480 series of IBM-compatible processors in Italy and other European countries.

The agreement "immediately doubles the potential [plug-compatible mainframe] market we can address and makes Olivetti the first large European company to begin marketing of [plug-compatible mainframes] there," Stephen J. Ippolito, IPL Systems president, declared.

Showing 1979 sales exceeding $2 billion,

Olivetti is one of Europe's largest suppliers, of distributed data processing, data communications and office automation products. IPL System, a domestic supplier of processors that are plug-compatible with medium-scale IBM 370, 30 Series and 4300 mainframes, has more than 130 systems currently installed.

IPL Systems' mainframes are currently sold in the U.S. and Canada by Control Data Corp.

Although IPL did not predict how much money is involved in the five-year contract, Olivetti's first order was for $5 million.

HP Entering the '80s With Rejuggled Priorities

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — The threat of growing competition during the 1980s has forced Hewlett-Packard Co. to re-examine some of its most cherished notions about where marketing and production fit into a high-technology firm's scheme of management priorities.

Although HP has always tried to keep its marketing and production strong, it has traditionally subordinated those disciplines to engineering interests, according to company President John Young.

During the 1980s, however, the firm plans to juggle some of its management priorities to make its commitment to engineering, marketing and production more nearly equitable than in the past, Young said at HP's semi-annual security analysts meeting on Jan 23.

Young assured the analysts, however, that his firm will continue to invest heavily in engineering to maintain its technological strength.

New Alignment

The shift in HP's business emphasis coincides with the dawn of a decade during which the firm expects to face a new alignment of industry competitors. That new alignment will include not only HP's traditional challengers — Digital Equipment Corp. and the established mainframers like IBM — but also formidable market newcomers, especially semiconductor firms like Intel Corp. and Texas Instruments, Inc., Young said.

To adapt to the changing competitive environment of the 1980s, HP will have to strengthen its marketing organization and master the intricacies of in-house semiconductor production, according to Paul Ely, vice-president and general manager of the firm's Computer Systems Group.

Looking ahead to the coming year, Ely expressed confidence that the computer industry and the U.S. economy in general will escape 1980 without a serious recession. But if a business slowdown does occur, it would probably improve HP's market share simply because the firm is in better position to endure economic hard times than many of its weaker competitors, Ely said.

Another often-hostile industry force that stands to work to HP's advantage is IBM itself. Far from harming HP's competitive position, the industry giant has historically proven a boon to the minicomputer maker by taking market steps that often parallel — and thus legitimize — actions pioneered years earlier by its smaller competitor, Ely explained.

When HP decided several years ago to unbundle its software and support, for example, the industry at first looked askance at the move. But HP's actions were ultimately vindicated, Ely said, when IBM recently introduced products that in effect gave unbundled software its stamp of approval.

Ely did voice some concern, however, about how HP's business might be affected when IBM begins volume shipments of its System/38.

Earlier during the meeting, Young told security analysts that sales for HP's Computer Systems Group rose 43% during fiscal 1979 to $1.5 billion. Last year marked the HP systems division's debut as a "$1 billion computer company," Young said.

Sales of business and technical computer systems accounted for 60% of HP's total 1979 revenues, which came to $2.5 billion by the time the fiscal year ended on Oct. 31, Young added.

Although the firm's overall revenues jumped 35% during 1979, Young expects prevailing economic conditions to make 1980 a below-average sales year for HP as a whole. In the firm's computer division, however, growth rates during the current year will exceed the companywide average, with business DP systems accounting for a larger slice of the sales pie than their technical counterparts.

Thus far during 1980, HP's revenues show no sign of the declining growth rate Young foresees for the year as a whole. The firm's overall sales for the first two months rose 42% over the previous two month's revenues.

In other comments, Young said HP hired 10,000 additional employees, including 2,900 professionals, last year. The new recruits brought the company's worldwide employment to 52,000.

Lineup Revamped at NCR

DAYTON, Ohio — NCR Corp.'s recent appointment of Manuel Garcia to the position of senior vice-president, executive office, topped a list of major management changes at the company.

Garcia was formerly senior vice-president of the U.S. Data Processing Group. P.W. Lappetito, formerly vice-president of NCR's Canada/Latin America region, succeeds Garcia.

G.P. Williamson, formerly vice-president of the Commercial-Industrial/Medical - Education - Government Systems Division of the U.S. Data Processing Group, was promoted to vice-president of the Canada/Latin American region.

A.J.R. Oosthuizen, former president of NCR Canada, succeeds Williamson.

R. W. Mahoney takes over as president of NCR Canada. He was previously assistant vice-president for financial systems in the Far East/Australasia region.

In another change, A.S. Gillan, vice president of the firm's Middle East/Africa region, will retire effective July. He will be succeeded by R.E. White, currently vice-president of administration and personnel, on March 1.

In addition D.J. Herman, president of the wholly owned subsidiary of NCR Comten, Inc., has been named a vice-president of the parent company. He will remain chief of the subsidiary.

Executive Corner

Other Moves

• Burroughs Corp. has appointed Donald E. Young to the new position of executive vice-president of diversified products and promoted Eugene Smith to senior vice-president of finance.

Young will be responsible for the operations of the Office Products Group, the Federal and Special Systems Group and the OEM Division. Smith has been the firm's chief financial officer since 1976 and a member of the board of directors since 1977.
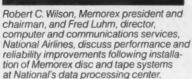
In another move, Burroughs elected Coy G. Eklund, president and chief executive officer of the Equitable Life Assurance Society, to the firm's board of directors.
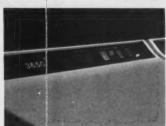
• Stephen F. Keating, vice-chairman of the board of directors at Honeywell, Inc., will retire June 1. He will remain on the board as an outside director and will continue to chair the board's European Advisory Council.

KEEPING TRACK OF MORE THAN ONE MILLION PASSENGER RECORDS CALLS FOR THE MOST RELIABLE COMPUTER SYSTEM AVAILABLE.

Robert C. Wilson, Memorex president and chairman, and Fred Luhm, director, computer and communications services, National Airlines, discuss performance and reliability improvements following installation of Memorex disc and tape systems at National's data processing center.

THAT'S WHY NATIONAL AIRLINES CALLED ON MEMOREX.

Customers are the top priority at National Airlines. Whether they are flying for business or pleasure, or shipping vital cargo, they expect fast, dependable service. So when National began to outgrow the capacity of its data processing system, it naturally looked for a computer equipment supplier with that same kind of quality reputation. National selected Memorex to provide new disc and tape storage systems.

"Our data processing center in Miami is the heart of our worldwide reservation system," said Fred Luhm, National's director of computer and communications services. "The data base contains over one million passenger records. At peak periods, the system must be capable of handling up to 40 messages per second from reservation terminals, with a response time of less than three seconds per message. The disc devices must handle more than 350 accesses per second."

In this demanding environment, computer equipment reliability is critical. To meet the requirements for added data storage capacity and high reliability, National installed Memorex's 3650 Disc Storage System for on-line processing applications, and its 3228 Tape Storage System for additional storage.

The results? According to Fred Luhm, National's data storage capacity has increased by more than 800 percent, while equipment uptime has improved to more than 99.99 percent. "We were also impressed with the exceptional value of the Memorex equipment which, in our opinion, is superior to anything else on the market," he added.

If you have critical data processing requirements, you should call on Memorex too. Contact your local Memorex representative, or write Memorex Corporation, Large Storage Systems Group, San Tomas at Central Expressway, Santa Clara, California 95052. Telephone: (408) 987-0701.

Unique, innovative ideas from the country's eighth largest data processing company—worldwide.

MEMOREX

Penril Puts Its Modems In a Retail Store

ROCKVILLE, Md. — Penril Corp., a manufacturer of data communications equipment, has begun marketing its modems through a retail computer store.

Penril's modems are used primarily by large corporations and government agencies to transmit computer data through the telephone system. But since modems are currently experiencing a lead time of about nine weeks, Penril decided to establish a distributorship with Bit, a six-month-old small business computer retail store in suburban Washington, D.C.

Bit, which also acts as an OEM for Digital Equipment Corp., has had several inquiries in the last few months about modems and decided to begin stocking them to eliminate lead-time lags for its customers.

If a Penril customer wants only one modem, Penril sends them to the store, according to Scott Moore, Bit's co-owner. Bit is currently stocking about 15 of Penril's 212A Bell-compatible switchable 300- and 1,200 bit/sec modem line.

Since Penril's first entry into the retail market seems to be proving successful, the company may market other products this way. "If we find an interest by an outlet for another computer-related product, we would be happy to market it any way we can," a Penril spokesman said.

But Growth Slow This Year
F&S: Semi Sales to Double by '85

NEW YORK - U.S. semiconductor firms will experience a slow growth rate in 1980, but worldwide shipments of solid-state memory devices will more than double by 1985, according to a report by Frost & Sullivan, Inc. (F&S).

Shipments of solid-state memory devices registered at $1.4 billion in 1979, a figure that will increase to $1.7 billion in 1980 and climb to $3.7 billion by the middle of the decade, marking an 18% annual growth rate, according to the F&S report entitled "The Solid-State Memory Market in the U.S."

A high growth pattern is almost assured following the temporary economic slowdown expected in 1980, the report stated.

Declining prices per memory bit will continue, according to the report. For example, the price per bit of MOS dynamic random-access memory (RAM) stood at .064 cent in 1978 and .042 cent in 1979; it is forecast to decline to .030 cent in 1980 and then plummet to .0006 cent by 1985.

The report also projected that MOS dynamic RAMs will remain the principal device for computer mass storage, which will see a "complete demise" of 1K devices by

1985, a "waning" of 4K memories and a "peaking" of 16K RAMs. Additionally, the 64K chip will have peaked by 1985 and a growth cycle will have begun on 256K devices, F&S said.

The annual growth rate for RAMs measured in bits will be 66% between 1978 and 1985, the report predicted.

New Markets

Serial memories with charge-coupled device (CCD) usage will "grow at a snail's pace, if at all," after a modest growth in 1980, the report indicated, adding that the long-term viability of CCD is doubtful unless a 265K-bit CCD could be produced by more than one vendor — a task which is open to question, F&S said.

On the other hand, the future of non-volatile bubble memory that can be produced in very high densities is looking bright since military and space needs continue to rely on bubble technology, the report indicated.

Another possible new market would entail linking a bubble module to a floppy disk to enhance performance while creating a removable media. Moreover, 8 in. rigid disks could siphon information through a bubble buffer, F&S noted.

Because of such reasons, F&S forecast that 1M-bit bubble memory devices will "generate outstanding sales growth in due course." F&S also predicted that 4M-bit devices will appear within the next three years.

The changes in the market and the performance of memory devices should be carefully watched by users, F&S warned. In general, cost per bit and access time are the key variables for determining the usage of a particular device, although power dissipation, volatility and device architecture, all of which may overlap, can also be important.

MOS static RAMs, for example, offer an automatic power-down feature that cuts power consumption by some 80% — a major advantage when compared with bipolar RAMs, according to F&S.

Simpler memory cell configuration and trade-offs in density and speed will also come into play. Shifting performance levels among the various device types caused by advancing technology also make selection complex.

The 269-page report costs $875 from the F&S Customer Service Department, 106 Fulton St., New York, N.Y. 10038.

Olivetti, IPL Make Pact

IPL Systems' mainframes were previously sold in Europe through Itel Corp., but that agreement ended when Itel sold its European installed product base to National Semiconductor Corp., an IPL Systems competitor. IPL Systems will continue to support mainframes under the earlier agreement while supplying mainframes to Olivetti, according to the vendor.

The IPL 480 series mainframes will be marketed by Olivetti as the OC 5300 series. Shipments to Olivetti have already begun. Olivetti will also market and support Hitachi Ltd.'s large-scale processors as the OH 5500 series.

The Italian firm will market the plug-compatible mainframes through a dedicated field sales and support organization, supporting IBM software as well as IPL Systems and Hitachi processors. Sales efforts will initially focus on customers ready to migrate to the IBM 4300, but will also be aimed at non-IBM users, particularly in government applications.

Marketing efforts will begin in Italy and be expanded to other European countries.

DEI Adds Facilities to Handle Drive Production

SAN DIEGO, Calif. — Data Electronics, Inc. (DEI) has leased three facilities here to meet increased production needs created by the firm's introduction of two backup cartridge tape drives for Winchester fixed disks.

"There's an untapped marketplace for products of this type," according to Sam Thompson, DEI's vice-president of marketing. Although Winchesters have been around for nearly seven years, vendors are just beginning to branch out and offer a spectrum of products geared to Winchester technology, he said.

DEI's new contribution to the growing market is a pair of streaming digital cartridge tape drives that will provide removable media backup for Winchesters. These tape drives have capacities of 10M bytes and 20M bytes and OEM prices are $746 and

$788, respectively. Streaming provides a continuous flow of data between the disk drive and the backup device, operating without interblock gaps and providing multitrack bidirectional recording technology, Thompson explained.

Last year's sales increased sharply over 1978 levels and Thompson sees continued rapid growth, particularly for tape devices in the 30M-byte-and-under range. DEI's intro-

duction of the 10M-byte and 20M-byte models reflect this market need, he said.

Claiming to hold 50% of the market, DEI specializes in 1/4-in. Ansi Ecma tape cartridges. The company has reached a $12 million annual sales mark, averaging a three-to-one growth rate over the last several years. DEI originally went into the 1/4-in. cartridge drive market because competitors were concentrat-

ing on other markets, according to Thompson. DEI's philosophy is to fill a void left by other companies rather than compete in an overcrowded market, he noted. DEI now sells only to OEM customers but realizes that if it intends to sustain its growth rate, it will eventually have to enter both the systems house and end-user markets, Thompson said.

DEI's new 77,000 sq-ft facility will house the six-year-old

firm's corporate headquarters and its automated manufacturing lines for the two new products. More than 400 people will be at work in the San Diego plant, while DEI's original plant in Pasadena, Calif., will continue to operate and manufacture its other products.

The new plant and coporate headquarters are at 10150 Sorrento Valley Road, San Diego, Calif. 92121.

U.S. Cancels CDC Show

MINNEAPOLIS — The U.S. State Department has informed Control Data Corp. that it is cancelling the exhibition of art from Leningrad's Hermitage Museum that was to have opened in the U.S. in May.

CDC, the exhibition's sponsor, was told that the art show "was not in the national interest at this time." The cancellation is one in a series of recent moves by the Carter Administration against the Soviet Union.

CDC had already spent nearly $1 million in preparation for the exhibit, which would have been the largest display of Soviet-owned art ever shown outside the USSR.

Cities Chip Away at Silicon Valley Density

At the very least, the recent actions here and in Palo Alto suggest an increased public willingness to challenge the no-holds-barred growth philosophy that has been accepted in Silicon Valley as an article of faith for the past 20 years. Behind the area's emerging anti-growth movement lies the widespread conviction that many local communities are already saturated with industrial construction and that they should be protected from further development until they can absorb it more readily.

Driven by an insatiable appetite for expansion, many local companies have gobbled up choice real estate that otherwise might have been set aside for housing construction. As a result, single-family housing in Silicon Valley is now in acutely short supply.

For years, Silicon Valley's elected officials gave a virtual blank check to local industrial expansion and did little if anything to correct the area's growth-related problems. During the last year or so, however, some of the area's city councils have begun to rearrange their political priorities.

Sunnyvale Actions

Last December, the Sunnyvale City Council took a straw vote that showed five of its seven members favored a moratorium on new industrial development. Then, in January, the council gave the moratorium idea its formal stamp of approval by the same 5-2 margin.

Since the January ballot, the city council "has very definitely expressed a desire not" to extend the moratorium beyond its current April 30 expiration date, according to City Planning Officer Ed Moore.

At the same time, the council has formed an interagency study group to prepare a report outlining the city's main growth-related problems and recommending possible remedies. The study group — which is composed of representatives from the city's Planning Department, Community Development Office, Public Works Department and other municipal agencies — is scheduled to complete its report about midway through the four-month moratorium.

The council will then review the study group's findings and, on April 30 or sooner, announce a series of proposals for expanding the community's housing supply and alleviating the strain on its major public services.

No one knows for sure exactly what course of action the city council will finally pursue. But some sources here suspect the group might try to rezone industrial property into residential acreage or even propose creation of a general housing fund to which local industry would be required to make regular contributions, Moore said.

Turnkey Vendor, CDC Lock Horns

products" to customers on a national basis. In mid-1978, however, CDC withdrew the software it originally supplied to fit the Cyber 18 — which included manufacturing, distribution and accounting system packages — and substituted the credit collection software, Hill claimed.

CDC then reportedly sent the Ohio firm Cyber Credit's pricing information, hardware configuration charts and other marketing materials.

Demonstration Nixed

About a year after C.H.S. started its selling campaign, it contacted CDC, told executives there that it had a number of customers lined up and asked to set up a system demonstration. CDC refuse to allow the turnkey company to stage its own product demonstration and informed Hill that CDC already had a number of installed and working systems.

These Cyber Credit systems were located at six Citibank centers in New York and at other banks in Baltimore and Hartford, Conn.

CDC's demonstration refusal "was the first indication we had that there was a problem with us trying to sell [Cyber Credit]," which was slated to cost about $75,000 per system, Hill noted.

Shortly after, the computer manufacturer pulled its entire contract with C.H.S. to supply it with CDC products.

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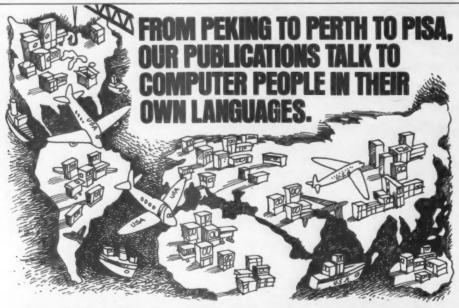
Meanwhile, as C.H.S. and CDC lawyers wrangle over which firm is contractually right and if litigation should enter into the affair, Hill is feverishly trying to recover from what he calls "a drastic blow" to his business.

The problem with the Cyber Credit wasn't the first time CDC "burned" C.H.S., Hill said. In mid-1978, the turnkey company reportedly signed an agreement with CDC to market a microcomputer-based business system.

Called Pegasus, the system was scheduled to sell for about $12,000, but "six weeks after [CDC] announced it, [CDC] pulled it back off the market," Hill claimed.

While the CDC spokesman could not recall anything about a product named Pegasus, he did say CDC announced an intelligent terminal at about that time that was labeled the C-760. The terminal was taken off the market by CDC several weeks after its introduction because "it didn't meet market requirements."

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For more information, contact Elaine Rosenberg, Wang Laboratories, Inc., Dept. # C-5 One Industrial Avenue, Lowell, MA 01851. (617) 459-5000.

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